

FEED

from the Egg
to the
Market



Price
25¢

Third
Edition



**Collis Products
Company**
CLINTON IOWA

COLLIS PROCESS PURE DRIED BUTTERMILK

The Romance of GOLD

GOLD ore is valuable—but pure gold is a hundred times more precious! Why? Simply because all foreign material, waste matter and slag have been taken out of the ore; only the valuable gold in its purest state remains.

The same is true with buttermilk. You seek only the valuable milk solids and lactic acid—the water is of no value to you.

In Collis Process Pure Dried Buttermilk you get in the purest form, the food values of the buttermilk—the vitamins, the lactic acid and the milk solids remain but the water is gone. It is pure gold, not gold ore!



COLLIS PRODUCTS CO.
CLINTON, IOWA



FOREWORD

IN PREPARING this third edition of "Feed from the Egg to the Market" for the poultry raisers, it was our sole endeavor to give them a volume containing only the basic and fundamental principles of poultry feeding and to prepare the material in a fashion that would make it simple to read and easy to understand.

There have been many splendid books written on general poultry keeping but in writing "Feed from the Egg to the Market" we have purposely refrained from technicalities and complicated scientific language in order to present the subject of poultry feeding as simple as possible without omitting any essential details.

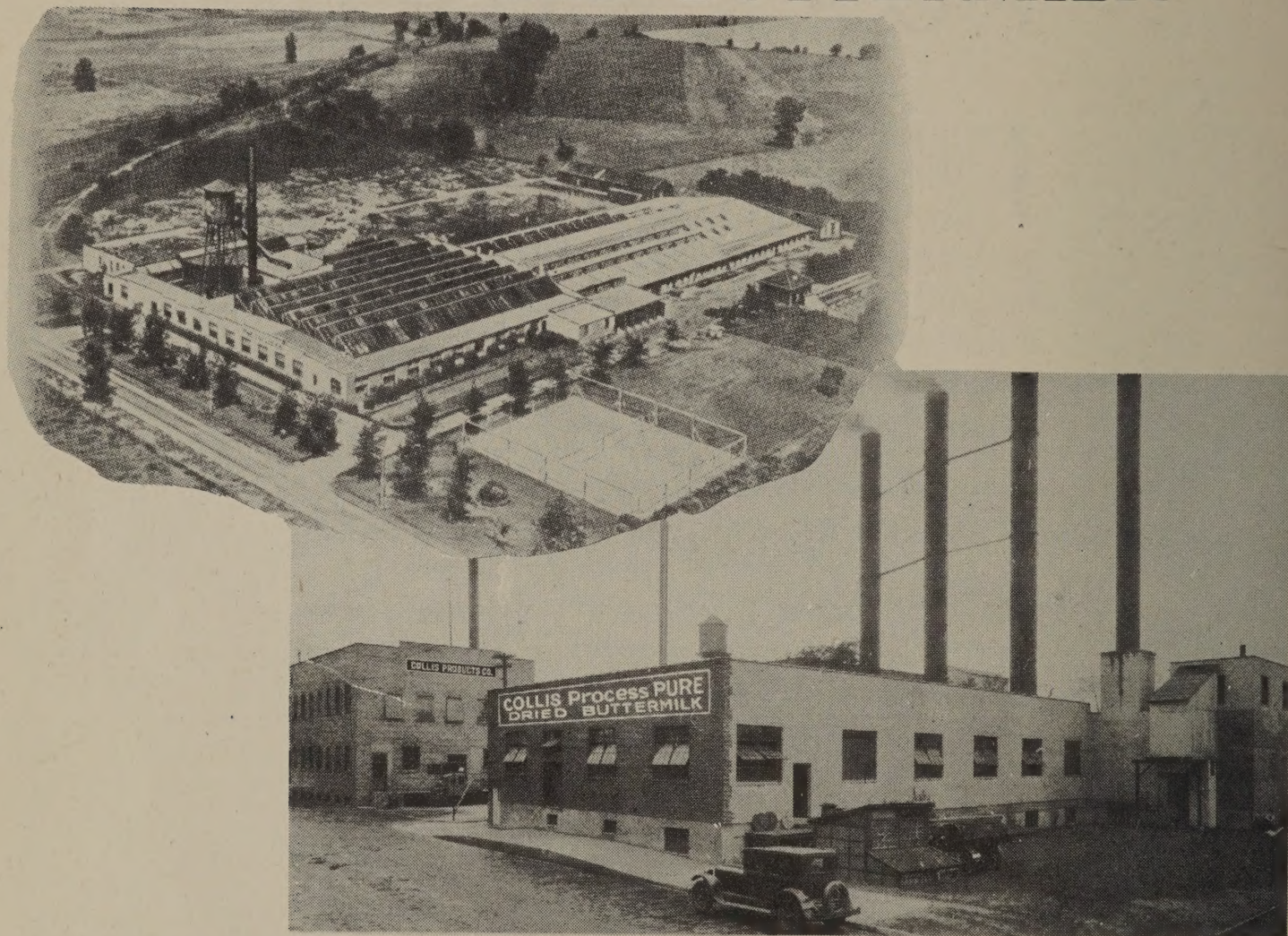
It is hoped this book will awaken interest in the value and importance of correct feeding among poultry raisers. To that end the authors have contributed their efforts and better poultry, profitably raised, will be sufficient reward.

The authors desire to acknowledge their appreciation to all those who have so materially assisted in the preparation of this edition. Without their aid it would have been difficult to have presented the contents.

"Feed and care for your chicks if you expect your chicks to feed and care for you." — Collis Products Co.



THE HOME OF COLLIS PROCESS PURE DRIED BUTTERMILK



ABOVE are shown two of the big Collis plants which illustrate the completeness of the facilities and organization behind "Collis Process Pure Dried Buttermilk."

SHIPMENTS are made from either St. Paul, Minn., or Omaha, Nebr.—two convenient railroad centers, thus insuring promptness in filling orders.

General Offices are located in Clinton, Iowa.

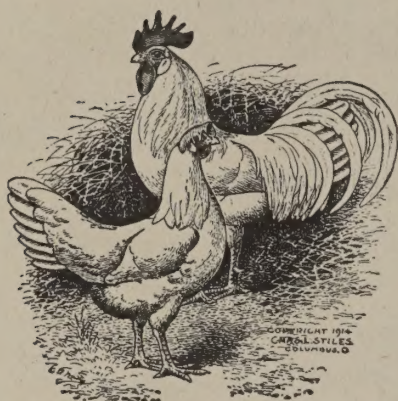


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PRINCIPAL FACTS ABOUT SOME OF THE STANDARD BREEDS



S.C. WHITE LEGHORNS

The greatest layers in the world. S.C. White Leghorns rank among the highest in all egg laying contests.

Most of the commercial egg farms stock this breed because of their dependability and laying qualities.

Chicks grow quickly and feather out very young. Some even having full feathers at 5 weeks old.



S.C. BROWN LEGHORNS

Here is a hardy, vigorous and prolific breed that, like the White Leghorn, are wonderful layers.

Single Comb Brown Leghorns have strong five-point combs with beautiful, soft coloring that gives these birds distinction over most other breeds.



BARRED ROCKS

The "old reliable" breed that is perhaps the best known of all fowls.

They are recognized by poultry buyers as a highly desirable market fowl. Their eggs are large brown. With proper feed and care they will lay during the entire winter.



SINGLE COMB REDS

Here is a breed that has been exceptionally popular during the past 10 years. There are probably more Single Comb Rhode Island Reds on general farms than chickens of any other breed.

They are wonderful layers, good setters and make excellent mothers.

PRINCIPAL FACTS ABOUT SOME OF THE STANDARD BREEDS

WHITE ROCKS

—are like Barred Rocks, differing only in plumage. They are preferred by some breeders because of their beautiful white plumage, red wattles, ear lobes and yellow legs. The total absence of black pin feathers add to their popularity.

Without doubt this breed is a market favorite and those who raise their flocks primarily for table birds prefer White Rocks.

BUFF ORPINGTONS

A choice table bird—either as broiler or roaster. They develop rapidly. In fact, eight week old cockerels weighing two pounds are not uncommon.

They are excellent winter layers and show better egg records, on a yearly average, than most of the larger breeds.

Their color is a beautiful deep golden buff. They are stately in appearance, with long, round, deep bodies, full breasts and broad backs.

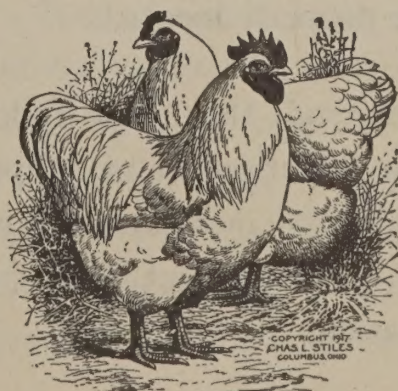
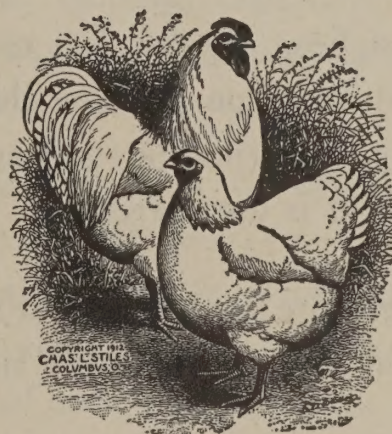
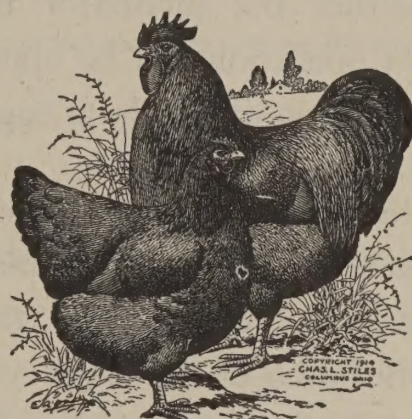
WHITE ORPINGTONS

A proud bird of fashion that tries to mimic the peacock's dignity. They are steady, dependable layers and during winter months when eggs are high, these birds pay dividends to their owners.

The White, like the Buffs, have a white skin, and white shanks.

WHITE WYANDOTTES

These birds cannot be excelled for broilers because of quick feathering and plump bodies. They are good layers, easy to raise; they make attentive mothers and are always good as table birds because their flesh is fine grained and their bodies compact.





THE INCUBATOR

THE FIVE important things to watch in incubation are: the egg, heat, evaporation (moisture), turning and ventilation.

The egg, of course, must be right. Its hatchability depends on the breeding stock, fertility, time and conditions under which it is kept before incubation. Neither the incubator nor the method of operation can be blamed for a poor condition of hatching eggs.

Heat is the first incubator problem. A lack of heat retards development. If heat has been regular, but too low, chicks will hatch on the twenty-second or twenty-third day of incubation.

If heat has been regular, but too high, chicks will hatch on perhaps the nineteenth day. Alternating too warm and then too cold is not correct.

The temperature must be regular for eggs to hatch in the proper 21-day time.

An accurate thermometer is needed and it must be properly located.

We recommend that you follow explicitly the directions as to temperature furnished by the manufacturer of your incubator. Next to heat is the problem of evaporation.

A certain amount of evaporation should occur from each egg in order that the air cell may be the right size for the chick's beak to enter and receive its first breath of air into the lungs.

If the air cell is too large the chick will be too small to reach the shell to break its way out; if the air cell is too small the chick's beak can not enter the air cell without striking the shell before its beak is clear of the waxy and gummy material in the egg. This causes strangulation.

Some incubators are equipped with a moisture guide scale scientifically figured out and based on the correct evaporation for that particular machine.

If no moisture guide is supplied the evaporation may be determined by weighing eggs or by observing the size of air cell. Turning the eggs is important.

Turning exercises the embryo, gives the blood vessels a new feeding and breathing ground and also loosens the membrane which helps to make the position and shape of the air cell.

Turning fixes the chick's position in the egg ready to hatch. The embryo gets its head to the highest point in the egg before it hatches.



COLLIS Process PURE DRIED BUTTERMILK

EGGS FOR HATCHING

WISE BREEDERS have long ago learned that it is vitally necessary to start with the egg of the right kind if they are to get strong, vigorous chicks.

A healthy breeding flock is essential. From this flock eggs should be selected as to good, medium size, the right color and the correct shape. The best egg for hatching is the genuine egg shaped specimen, nicely rounded at one end with a gradual taper at the other and having a shell of good texture, free from imperfections.

It is a good plan to keep the eggs in an ordinary egg crate, in fillers with flats between the layers and the top of the case nailed on. Then it is an easy matter to turn the entire crate on a different side each day.

Care of Eggs Before Hatching

It is just as important to carefully care for the eggs before placing them in an incubator, or under a hen, as it is after the incubation process has been started. A hatch can be ruined before it starts as well as after the eggs have been set. The germ will start development if kept at a temperature above 68° F. It is not advisable to allow the room temperature where hatching eggs are being held to

INCUBATION TABLE

Here are the number of days required for eggs of the different species to hatch:

Pigeon.....17	Guinea.....28
Hen.....21	Turkey.....28
Pheasant...24	Goose.....30
Duck.....28	Muscovy Duck 35
Peafowl....28	Swan.....35

go below 45° F. The optimum temperature is between 50° and 65° F.

Chilling before setting kills the germ so that the egg candles clear, as an infertile egg does at the 7th day of incubation. A large number of infertile eggs may be traced to chilling, especially if it is known that the males are vigorous and active.

Frequent collection of eggs, in cold weather, not only helps to prevent chilling but also saves many broken as well as dirty eggs. There are apt to be a number of dirty eggs when the breeders are allowed out of doors in muddy weather. It is unwise to wash eggs that are meant for incubation so it is best to prevent having dirty eggs in the first place. This makes it necessary to watch the nesting material and change it when it gets dirty. Clean, fresh litter on floor helps greatly in preventing dirty eggs.

CARE OF THE SETTING HENS

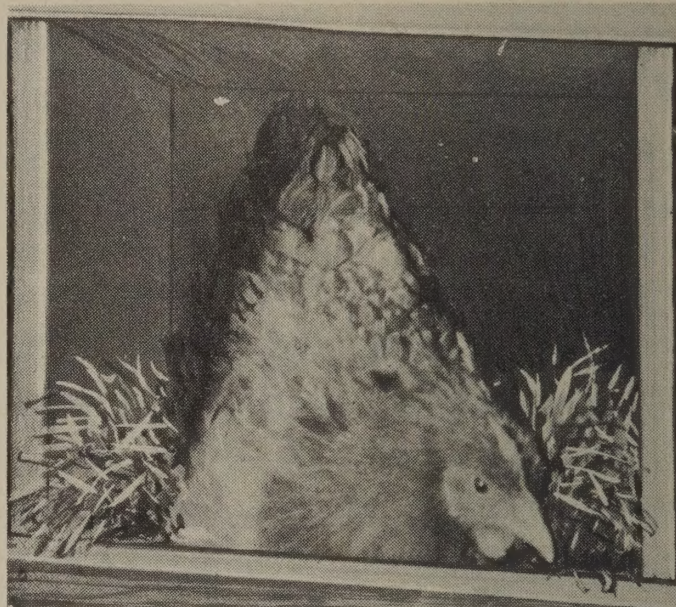
THE OLD mother hen is the determining factor in your baby chick hatch.

Quite often we find poultry raisers who use extreme care in housing, feeding, breeding, mating, etc., are quite lax in attention they give to the setting hen.

By that is meant that they take for granted that the setting mother hen will, more or less, shift for herself.

By all means, do not disturb the old hen on her nest any more than necessary—yet make sure that her nest is clean and comfortable and that her eggs are not damaged. Arrange for her feed, (shelled corn is best) and water close at hand to keep her from straying too far from the nest. It is best to see that the hen gets off the nest at least once a day for feed and water.

Keep the setting hen as quiet as possible and free from excitement or disturbance.



Dogs, cats, puppies, etc., will excite her and cause her to leave the nest from time to time. This, any poultry raiser knows, is bad.

Keep her body and nest free from lice and mites. These parasites create excitement that results in broken eggs and a poor hatch.

Just give a thought to the setting hen. See that she is free to hatch her eggs with as little worry as possible.

HOW MANY EGGS TO SET

It has been figured out that five eggs should be set for each pullet desired. In order to figure on getting 100 pullets when fully matured, 500 eggs must be set. Of the original number set, 10 per cent must be figured off for infertility.

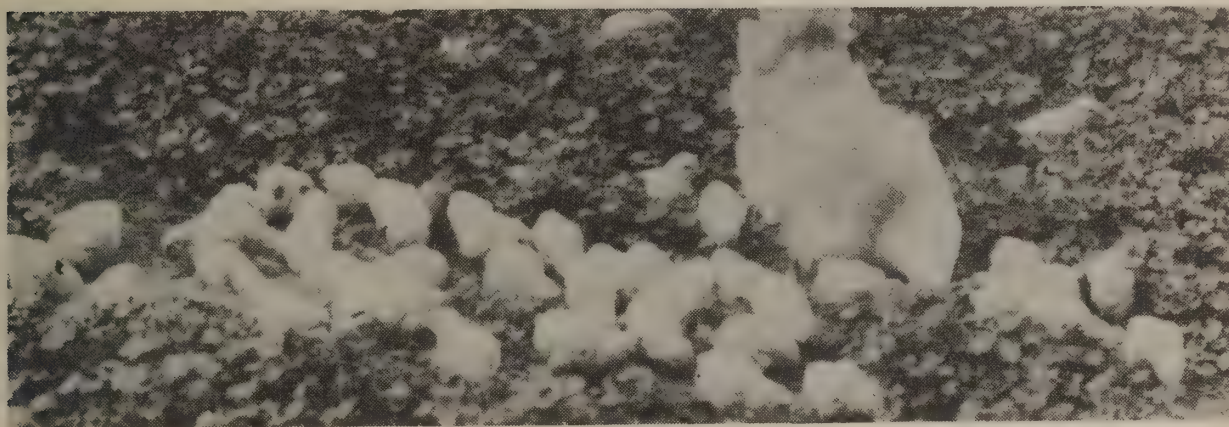
Of the remaining eggs, it is figured that 60 per cent will hatch. A 20 per cent mortality is figured on the chicks that

hatch. 50 per cent of the remainder will be cockerels. According to this figuring of the original 500 eggs, 108 will turn out to be pullets.

When buying chicks, 3 chicks are figured for each pullet. So if it is desired to have 100 pullets, 300 chicks must be bought. These are average figures and may vary a little one way or the other.



FEED BUTTERMILK TO GET FERTILE HATCHABLE EGGS



HOW CAN we secure more hatchable eggs? This question is asked more often than any other by the average poultry keeper. That every egg will not hatch is well known to all, but a greater percentage may be hatched by good feeding methods.

Nature's own remedy for fertility, growth, development of bone, muscle, tissue, vitality and disease-resisting qualities are all summed up in the one word "milk".

The vitality of the male stock has as much to do with good hatches as that of the female. If your birds are low in vitality, poor hatches can be certainly expected. The higher the vitality the better the hatch will be under general conditions, and to secure this vitality buttermilk has no equal. It contains not only the protein and the vitamin but also the minerals so necessary to better reproduction.

Collis Process Pure Dried Buttermilk contains over 8½% mineral. This mineral is particularly valuable, as it contains that quality of mineral salts so necessary in reproduction and is an insurance of more fertile eggs when used with green feeds. No satisfactory substitute for buttermilk has yet been found.

When milk has to be purchased, as it has to be by 95% of the poultry keepers, it should be bought in its most economical form—as dried buttermilk. Collis Process Pure Dried Buttermilk contains only 7.5% water. It is unequalled in low transportation costs as freight is paid only on food values, and not water.

We know that sunshine, sanitation, good feed and healthful exercise work wonders on young chicks. It is just as important to apply the same principles to the embryonic chick that is to be started in the

egg within the body of the mother hen. Keep breeders in well ventilated houses. Keep yards, houses and drinking vessels well disinfected and clean. Give breeders plenty of exercise to keep the digestive organs in a healthy condition.

A well balanced mash ration should contain at least 18% protein. Part of the protein must be milk protein. It takes large amounts of protein to build up the waste tissues of the laying hen and to be stored in the egg to nourish the chick during incubation. At least one half of the protein should be obtained from some form of milk. Collis Process Pure Dried Buttermilk contains 32½% protein. One of the most economical sources of minerals and vitamins for the securing of a healthy development of the embryonic chick is Collis Process Pure Dried Buttermilk.

Healthy, vigorous hens fed and managed along this line will give a good account of themselves in the production of eggs for hatching. A few generations of such selection and care will reduce the loss in hatching eggs to the minimum. Mashers fed to breeding stock, both cocks and hens, should contain at least 10% Collis Process Pure Dried Buttermilk.

FERTILE EGGS RULES TO REMEMBER

1. Proper housing and proper care must be provided for the birds.
2. Sufficient outdoor exercise, sunshine, buttermilk and cod liver oil must be provided.
3. Poultry raisers must not force breeders for egg production.
4. Good, active breeding males must be put into the flock.
5. Care must be used to not over-feed and to feed plenty of green food and buttermilk.
6. Interference between male birds must be prevented.



GIVE THE EARLY CHICKS A CHANCE

THERE is a growing tendency to advance our hatching date so as to allow pullets to become more mature before we bring them into production. This is a good practice but early chicks need special care.

All chicks are helpless but special caution is necessary to provide proper temperatures for early chicks. See that they have a warm place to rest their tired little bodies and a cozy bed for comfort through the night.

Little chicks are not always thought of in this way. Sometimes no preparation is made for their coming, yet if they are murdered through lack of care, some folks are inclined to complain. Give the little chicks a chance.

Feed, of course, is important and this is covered in other pages of this book.

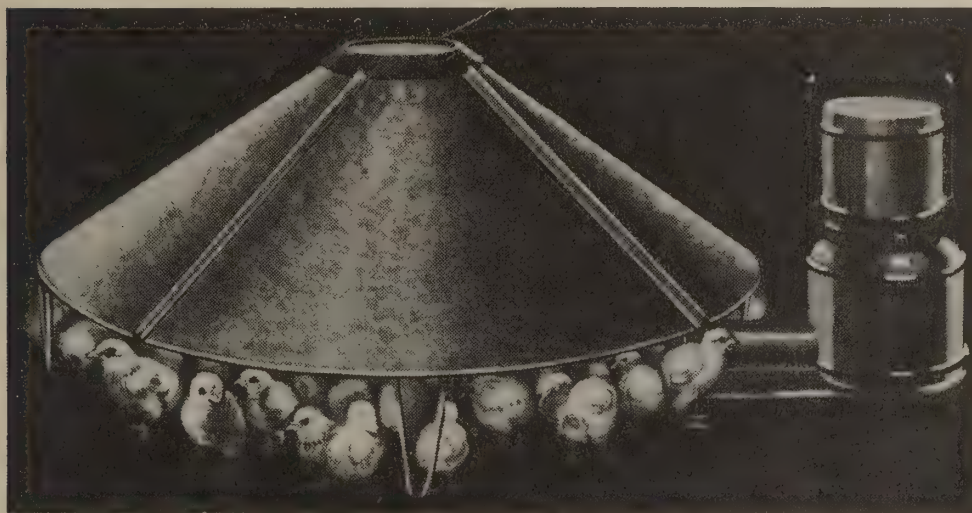
From the time the chick is hatched until it is strong, ready for feed, the best thing you can do is let it rest in a dark, warm place with plenty of ventilation. It needs a lot of sleep in order to start the digestive system moving smoothly.

Too much action and crowding are not conducive to good sleep. Start it out with a good, sound sleep and it is quite likely that with reasonably good brooding conditions, it will be raised successfully.

Do not wait too long to start the brooder stove in the brooder house. See that the brooder house is thoroughly dried out and warm when the chicks are placed in it. During periods of freezing temperatures it may take 3 or 4 days to warm up a concrete floor. Chilling produces diarrhea. If it is a large brooder house, the stove should be started at least two days before the chicks are hatched. During this time the stove can be regulated and the house can be thoroughly dried after its long period of disuse. A temperature of 100 degrees near the hover is proper.

Remember, buttermilk plays a very important part in the life of the early chick. It gives chicks the added vitality they need to withstand severe climatic conditions.

BROODER RAISED CHICKS ARE HEALTHY CHICKS



ON THE average, brooder raised chicks grow faster, weigh more and sell at a higher price, up to the age of three months, than do chicks raised with hens. If conditions are right, the brooder raised chick is never allowed to feel the effect of dampness. It knows nothing about being dragged through wet grass or seeking a dry place during a rain storm. Lice are enemies to which it is unaccustomed. If it is cold or chilled the stove is within a few inches of its scratching ground. It can enjoy the

heat of the sun without being exposed to the wind.

The water the brooder raised chick drinks is of the proper temperature; not covered with ice and the food it gets is not only varied but given in a careful manner in a clean condition.

It has to do nothing for a living. Under the watchful care of the poultry raiser in place of the excited disposition of the mother hen, the chick grows fast because it receives plenty of food, all it needs to drink and the proper heat.

A FEW DO'S

Keep temperature in the brooder regular and supply sufficient fresh air.

Feed properly to avoid bowel trouble.

Clean feed and water containers daily.

Crockery or granite vessels are easy to clean.

Provide sufficient heat so that chicks do not crowd at night. See that the brooder is evenly darkened at all points.

Provide two drinking fountains and one 24-inch mash hopper for each 50 chicks. All must have room to eat and drink.

Remove and destroy any chick that misses

two meals in succession. It is considered as good as dead.

Use fresh litter often. See that it is clean next to the floor as well as on top.

Listen for the plaintive cry of the sick chick in contrast to the lusty chirp of the husky one. Remove the sick chick.

Don't forget the buttermilk and green food. If your ration contains sufficient dried buttermilk separate feeding is not necessary. If your ration does not contain dried buttermilk, include a sufficient amount with the feed. (See feeding directions on pages 12 and 13.)



CARE DURING THE FIRST SEVEN DAYS

FEW PEOPLE realize the advantage of giving the baby chick exactly the right care and attention. No book can take the place of experience. However, these suggestions will remind you of the most essential factors:

1. Keep the newly hatched chick warm, and if possible, quiet. A dark room is a big help.
2. There is almost as much danger in waiting too long before feeding chicks as there is in feeding them too soon. Since chicks are kept in an incubator several hours after they are hatched, they should be fed 36 hours after they are taken from the incubator. It is absolutely safe to start feeding chicks at this age providing the feed is right.
3. Discard all weak or deformed chicks. The best of care will not make good chicks out of them.
4. Be sure that the brooder house is dry, warm and free from drafts. A good floor covering is one-half inch of sand covered with finely chopped straw or alfalfa leaves. Operate the brooder according to instructions.

FEEDING THE BABY CHICK

Chicks need a ration that will supply material for good bone structure—the necessary elements for tissue growth—and give them the vitality to ward off diseases. Do not try to raise chicks without milk—it cannot be done successfully. Collis Process Pure Dried Buttermilk has been used extensively by the country's foremost poultry raisers. It contains all of the lactic acid and milk solids that are found in liquid buttermilk. It is the cheapest and most convenient method of supplying buttermilk. The lactic acid of the dried buttermilk makes conditions unfavorable for the growth of disease producing bacteria in the internal organs—thereby keeping the chicks in a

healthy, vigorous state. Buttermilk also aids the digestive organs of the chick, stimulating them to greater action and the secretion of digestive fluids which keeps the chick in the best of condition.

It is important to remember that the chick's life starts at the time it is hatched from the egg, and not at the time it comes out of the incubator. Feeding can start any time between 48 and 72 hours, counting from the hatch. As stated above, chicks are usually kept in the incubator several hours after they are hatched in order for them to dry out. Feeding, therefore, can normally start 36 hours after the chicks leave the incubator.



FEED ACCORDING TO THE FOLLOWING DIRECTIONS

This Starting Feed has given most excellent results. Many other formulas might give good results, but we know that this one can be depended upon.

An Excellent Starting Feed

- 35 lbs. Yellow Corn Meal
- 20 lbs. Flour Middlings
- 17 lbs. Wheat Bran
- 20 lbs. COLLIS PROCESS PURE
DRIED BUTTERMILK
- 2 lbs. Poultry Bone Meal
- 3 lbs. Chick Size Lime Stone
or Oyster Shell
- 2 lbs. Charcoal
- 1 lb. Salt

Total 100 pounds.

Thirty-six hours after the last chicks have been removed from the incubator, the chicks are ready to feed. If the above mash is used, it may be left before the chicks constantly. This mash may be fed on papers, or in shallow dishes, or hoppers, for the first two or three days. Then it should be fed in hoppers, using two feet of hopper space to each fifty chicks.

If this mash is kept before the chicks at all times they will not over eat. Feed nothing but this mash for the first ten days with this exception: a little sprouted wheat may be fed the chicks starting the seventh day. Feed the wheat when the sprouts are one-half inch long. Be sure the wheat has not moulded or soured. Wheat is used for baby chicks because it has less fiber than oats.

After the chicks are five weeks old, sprouted oats may be used in place of sprouted wheat.

On the tenth day the chicks may receive a light feeding of the following scratch feed:

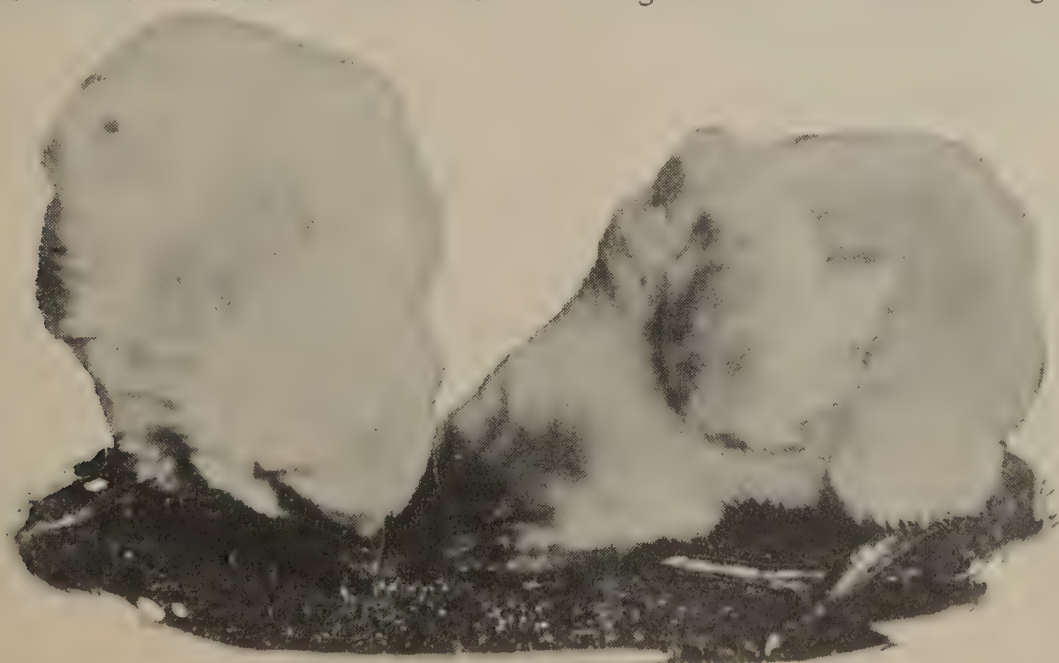
Equal Parts of { Medium Cracked Corn
Whole Wheat
Steel Cut, or Hulled Oats

Gradually increase the amount of scratch grain fed until on the 19th day they may be given all they will clean up in twenty minutes.

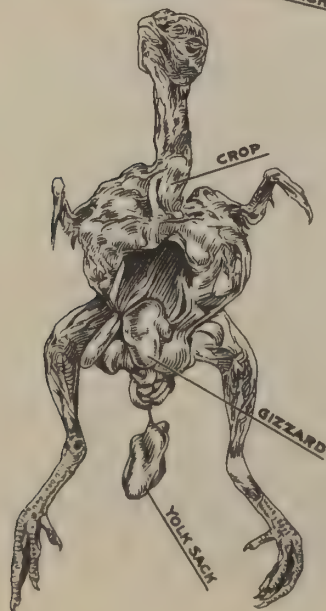
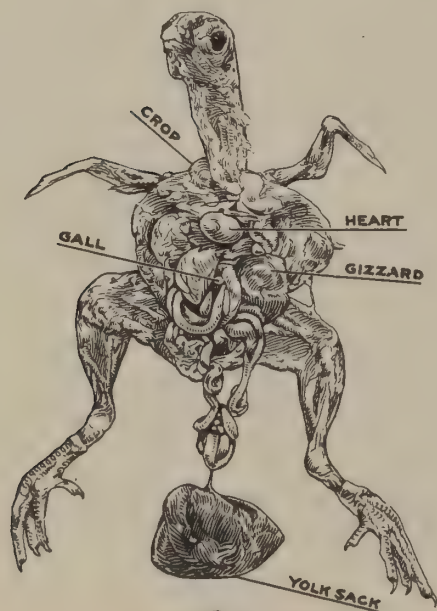
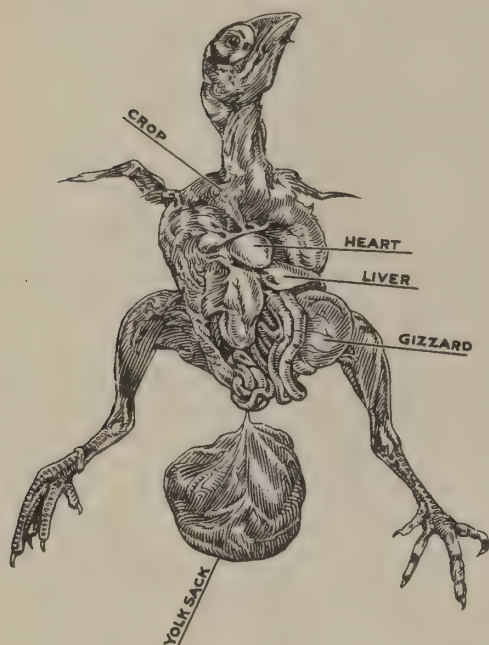
When the chicks are twenty days old, they may receive a light morning feed of scratch. The morning feed of scratch grain should never be more than one-half as much as the evening feed.

Limit the amount of scratch to one-half the amount of mash which the chicks are taking from the hopper. For example: If the chicks are eating three pounds of mash a day, they should not receive more than 1½ pounds of scratch feed a day. One-half pound of this scratch feed should be fed in the morning, and one pound in the evening. These proportions of scratch to mash should be continued until the birds are about ten weeks old. After ten weeks of age, equal parts of scratch for mash should be fed so as to prevent the pullets from coming into production before they have reached the proper size. If it appears that the pullets are developing too rapidly, the proportion of mash to scratch may be still further reduced.

At the age of five weeks, the chicks may be changed over, gradually, to the growing mash. However, if you will continue the birds on the starting mash until they are eight weeks old, you will have them past the danger of coccidiosis. For this reason we strongly recommend that the starting mash be fed for the first eight weeks.



How Nature Feeds the Chick



EDITOR'S NOTE: These drawings are made from actual photographs of baby chicks dissected by the Research Department of the Collis Products Co. and are reproduced to give you an idea of the absorption of the yolk during the first four days. All three eggs were incubated and the chicks brooded under like conditions.

The first illustration is of a chick only six hours old. The full yolk sack holds enough feed to not only keep the chick alive but to keep it growing for 72 hours.

The second illustration shows a chick two days old. Note that its yolk sack is less than half the size of the first. This chick has been living and thriving from the food in the yolk sack as it is still too young to be fed other feeds.

The third illustration is of a **chick** four days old. Note that it is ready **now** for feeding as its yolk sack has been practically emptied of all necessary food content.

These three illustrations show the normal absorption of the yolk. If the chick is not strong the yolk will not be properly absorbed. The feeding of plenty of buttermilk to breeders insures strong, sturdy chicks because they will be supplied with large yolk sacks filled with healthful food.

These illustrations also prove that feed is not necessary until after the 48th hour but that feed should be given before chicks are 72 hours old. It is important to know the age of chicks, counting from the time they are hatched and not from the time they leave the incubator. Chicks often have to stay in the incubator several hours after being hatched in order to dry out and gain strength. If the feeder does not know how long chicks were in the incubator after being hatched they should be fed 36 hours after leaving the incubator.



FEEDING THE GROWING CHICKS



*Nine-week old chicks, from same hatch as lower illustration. Not fed any buttermilk.
Average weight 14 oz. (This flock suffered a loss of 14 chicks.)*

AT THE age of five weeks, or preferably eight weeks, you may change over to the following formula, which will continue the excellent growth begun on the starting feed, but produce slightly

more economical growth than otherwise would be obtained.

The scratch feed to be fed with this mash may be made up of two parts of Cracked Corn, one part of Wheat (Note: whole corn may be used as soon as the birds are large enough to eat it readily). This method of feeding growing chicks may be continued until the pullets are ready for the laying house.

It is important to keep pullets growing throughout the Summer months in order to bring eggs when eggs are high in price. It has been conclusively proved that the poultry flocks, which have been well fed during the Summer, make by far the most profitable egg producers.

GROWING MASH

- 24 lbs. Ground Corn
- 20 lbs. Wheat Middlings
- 15 lbs. Wheat Bran
- 15 lbs. Ground Heavy Oats
(Clipped oats preferred)
- 10 lbs. COLLIS PROCESS PURE
DRIED BUTTERMILK
- 10 lbs. Meat and Bone Meal
- 2 lbs. Bone Meal
- 3 lbs. Ground Lime Stone
- 1 lb. Salt

Total 100 Pounds

*Nine-week old chicks, fed on feed containing 10% Collis Process Pure Dried Buttermilk.
Average weight 22 oz. (Only 4 chicks died in this flock.)*





SCIENTISTS AGREE that BUTTERMILK *WILL CONTROL* COCCIDIOSIS

EXTENSIVE laboratory research and field tests by the principal Agricultural Colleges, as well as the personal experiments of prominent poultry raisers show that coccidiosis can be controlled. It is a significant fact that most scientists and authorities on the subject of poultry husbandry agree that coccidiosis, a disease which annually kills millions of chicks, can be controlled by dried buttermilk.

A good ration, well balanced and containing at least 10% Collis Process Pure Dried Buttermilk, will often make the

chicks strong enough to resist the disease. But after the disease is once established chicks should be fed an all mash ration containing four parts Collis Pure Dried Buttermilk to 6 parts of grain products.

The control of coccidiosis should have the careful consideration of every poultry raiser. This dreadful disease is hard to fight—it is better to keep the chicks healthy and free from the disease than to try and cure the disease after it has once infested the poultry yard.

C. L. MANWARING, Owner of White City Egg Farm, Feeds Buttermilk to Control Coccidiosis

The words of advice and the experience of such a successful poultry raiser as Mr. Manwaring can well be heeded and followed by others. Mr. Manwaring raises poultry on a large scale. His experience is extensive and diversified. Here is what he says:

"Collis Process Pure Dried Buttermilk has been a mighty important cog in the outstanding success of our farm.

"As an aid to better production, larger eggs, increased hatchability and health, we have found nothing to take its place.

"In the developing of thrifty, vigorous, growing pullets—free from coccidiosis—it has no equal and we would be lost without it."

Coccidiosis is most likely to appear during warm, damp weather in chicks three to eight weeks old. During such weather Mr. Manwaring usually doubles the amount of dried buttermilk in his mash.



C. L. MANWARING



COLLIS Process PURE DRIED BUTTERMILK



FIGHTING COCCIDIOSIS

THE DEATH rate from coccidiosis often runs 20% to 60%, not counting the set-back that flocks suffer. The symptoms are very similar to those of white diarrhea except that it does not generally make its appearance until the 10th day or later.

Quite often it is mistaken for white diarrhea but can usually be distinguished by the presence of streaks of blood in the droppings.

Coccidiosis is a parasitic disease that attacks the linings of the bowels or intestines. Its effects become more apparent in warm and damp weather in the early Summer. Affected chicks have ruffled feathers, sleepy appearance and drooping wings; they have little or no appetite, crowd closely together and have a brownish white discharge frequently mixed with blood.

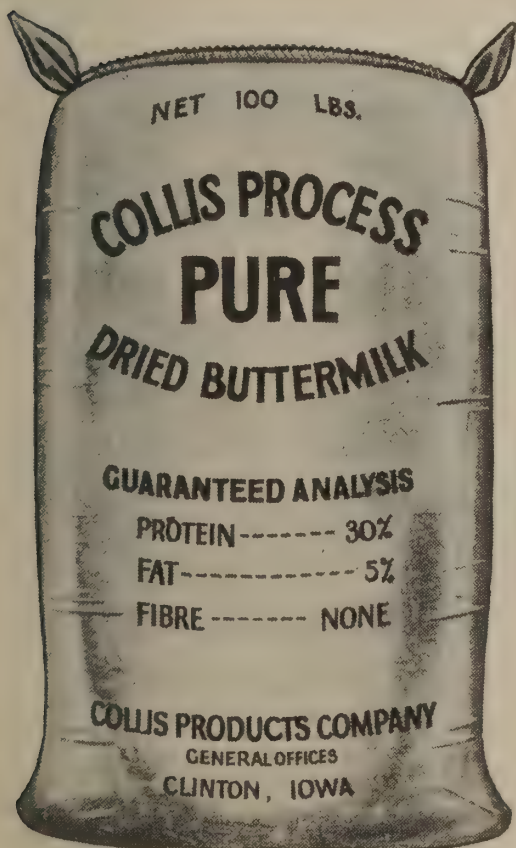
In addition to the use of Collis Process Pure Dried Buttermilk, as a preventive of coccidiosis, cleanliness is next important. The life cycle of coccidiosis is such that a part of its life is spent within the body of the chick and a part outside the body.

Therefore, it is necessary to keep chicks away from the droppings.

At the Ohio Experiment Station affected chicks were placed on a floor of one inch poultry netting so elevated to pass the droppings beyond the reach of the chicks. The death rate of infected chicks on the netting floor was 36% and on the cement floor 67%. No healthy, exposed chicks died on the netting floor while 42% of healthy and exposed chicks died on the cement floor.

Sanitation is very important in the prevention of this disease. Whenever possible every hatch of chicks should be put on new ground or when this is impossible the ground around the brooder house should be plowed or spaded up and air slacked lime applied.

The value of raising chicks on new ground cannot be over emphasized. Coccidiosis is only one of the ailments of poultry that can be avoided to a large degree if chicks are raised on ground which has not been ranged over for at least 2 years by either adult birds or chicks. Unclean ground is the source of many worm infestations. Plan to plant old yards to crops and use new ground next year.



**BUTTERMILK
WILL CONTROL
COCCIDIOSIS**
Feed GENUINE
Collis Process
**PURE
DRIED BUTTERMILK**



GROWING CHICKS NEED BUTTERMILK

MILK MAKES the difference. These three birds are from the same hatch. They had all they wanted to eat, of a carefully balanced ration, with this exception—the two smaller birds had no buttermilk.

This remarkable demonstration of the growth-producing properties of buttermilk carries a lesson no poultry raiser can afford to ignore. Buttermilk is not a luxury, but a necessity. It makes real poultry food out of ordinary poultry feeds. Malnutrition and leg weakness in many cases can be directly traced to the lack of milk in poultry diets. Faulty bone growth and undernourishment are the inevitable results of a ration that does not include mineral matter and the valuable proteins such as found in buttermilk.



Analyze the formulas you are now using. If yours is a home mixed ration see that it includes from $7\frac{1}{2}\%$ to 10% Collis Process Pure Dried Buttermilk. If yours is an open formula mill feed ration it will show, on the sack, how much buttermilk is contained. Build up the buttermilk content to reach $7\frac{1}{2}\%$ to 10% . If yours is a closed formula tell your feed dealer you must know how much buttermilk it contains so you can make sure it holds the required amount.

Authorities claim poultry will not consume enough liquid buttermilk (contains only $7\frac{1}{2}\%$ milk solids) to give best result. Use Collis Process Pure Dried Buttermilk. Its $92\frac{1}{2}\%$ pure milk solids forms the most economical way to buy and use buttermilk.

GETTING THE JUMP ON THE MARKET



White Leghorns, 4 weeks old, fed on mash containing Collis Process Pure Dried Buttermilk.

SOME poultry raisers seem to labor under the impression that scientific feeding is too costly and that early market prices do not justify the effort. It would be just as logical to claim that our grandfather's methods of plowing were more correct than our system because gang plows cost so much more than the old single bottom mould-board.

If you feed your flock anything you may have at hand your poultry will prove a financial loss—but follow a set principle of correct feeding and any one can make poultry raising profitable.

To get market birds off early, you should start the chicks right and keep them growing. Avoid “fattening” until the last week before you sell. Strive during the growing period to develop the birds without forcing them.

A very good ration that has proved successful on many farms which the author

has observed is given on page 20 of this book. Any experienced poultry raiser needs but to glance at the photograph on this page to quickly see the advantages of correct feeding.

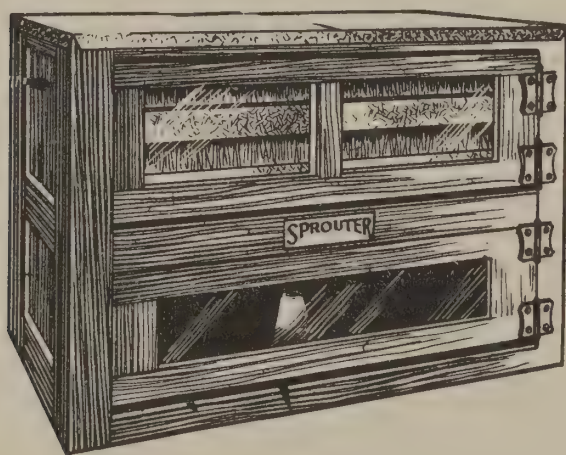
The birds in these pictures have been fed properly and will go to market two to three weeks ahead of their “puny” companions. They will bring top prices and even perhaps a bonus, while ordinary chickens will merely be average poultry.



Barred Rock Pullets, 6 months old, regularly fed on Collis Process Pure Dried Buttermilk.

OTHER FEEDS THAT POULTRY NEED

GREEN FEED—Poultry should have a supply of succulent, tender, green feed, whenever possible, throughout the entire year. If green feeds are not available, feed a good grade of bright leafy alfalfa hay. Nature supplies this to chickens on free range during the early part of the summer. When chickens are confined, or in bare lots, it is advantageous to provide green stuff in the form of sprouted oats, cabbage, mangle, etc.



GRIT—High grade lime stone grit and oyster shell should be kept before birds at all times.

WATER—A liberal supply of water, easily accessible, and in clean vessels is always worthwhile.

COD LIVER OIL—Cod liver oil of guaranteed vitamin content should be fed whenever birds are confined. Many poultry men find it advisable to



feed it the year round. It is especially essential to chicks that do not have access to direct sunlight.

Cod liver oil may be mixed into the mash or poured over the scratch grain. It is best to mix the oil with only enough feed to last one to two weeks as the oil gradually loses its value after being exposed to air. Feed from one pint to one quart to each 100 lbs. of mash, depending upon the amount of sunshine to which the chickens may be exposed.

MILK—Milk is very important in all poultry feeds. In the foregoing rations, it is supplied economically, and in sufficient quantities in the form of Collis Process Pure Dried Buttermilk.

If you have sufficient liquid milk so that your birds may have it before them at all times, it may be more economical to use the liquid milk. However, a light feeding of liquid milk once a day will not fill the bird's requirements. It is better to place a quantity of Dried Buttermilk in all rations.



There are three very sound reasons for putting Collis Process Pure Dried Buttermilk into your mash instead of trying to get along feeding liquid milk.

COLLIS Process PURE DRIED BUTTERMILK

First: Dried Buttermilk is a labor saver. When you put Collis Process Pure Dried Buttermilk into your mash the feeding of mash and milk becomes one operation, and your milk feeding problem is solved until the supply of mash has been used. If you are to feed liquid milk, the milk feeding would be a separate operation every day, or twice a day, and in addition you would have the extra labor of cleansing and sterilizing the milk utensils. You, no doubt, know how hard it is to remove milk that has dried around the edge of the dish. If you are busy, as most poultry men are, the time saved will more than off-set the additional cost of Dried Buttermilk.

Second: When the proper amount of Dried Buttermilk is placed in the mash you are sure that the chicks or hens are securing all of the milk which they need. If liquid milk is fed, the containers may become empty. They may be tipped

over, or you may not have sufficient milk available to meet the requirements of the flock.

The loss of profits from an insufficient or irregular supply of milk will often off-set the additional cost of Dried Buttermilk.

Third: Collis Process Pure Dried Buttermilk is far more sanitary than liquid milk. If liquid milk feeders are not thoroughly cleaned every day, there is a grave danger of disease entering the flock through this channel. Chicks drinking liquid milk will spatter considerable on the floor. Occasionally the liquid milk will be spilled. This liquid milk on the floor creates a very unsanitary condition, which will be a constant source of danger.

For safety first, feed Collis Process Pure Dried Buttermilk. The added efficiency of the ration will return a good profit on its cost.





BUTTERMILK IS ESSENTIAL IN ALL DEVELOPING MASH



Milk makes the difference. From the same hatch, fed the same high grade ration with the exception that the smaller bird was deprived of buttermilk. Here is an object lesson to which every poultry raiser can give serious thought.

DEVELOPING mash, to bring best results, must contain 10% buttermilk. Buttermilk with liquid content will not do. Poultry raisers claim birds will not consume enough liquid buttermilk to get the required amount of milk solids. 92½% water in liquid buttermilk cuts the food content down so far as to make the amount of food solids each bird receives almost negligible.

Dried buttermilk is the economical way to feed this essential food. 92½% food solids make it the most economical of all forms of buttermilk to use when cost of labor and results are considered.

As long as cream has been churned the health value of buttermilk as a delicious, refreshing food has been known. Buttermilk is a real food. It contains a very fine quality of protein, valuable mineral salts, sugar and the lactic acid which gives it very high medicinal and feeding properties.

The people of Biblical times associated buttermilk with long life. Poultry raisers today, who supply buttermilk to their flocks, have healthier birds and higher egg production. Buttermilk stimulates digestion, acts as a tonic and aids in correcting disorders in the alimentary canal.

Collis Process Pure Dried Buttermilk furnishes more than 8½% mineral matter for the development of feathers and bones.

Collis Process Pure Dried Buttermilk contains over 5% lactic acid. Lactic acid increases appetite, aids in the assimilation of food stuffs into the blood stream and regulates the working of the alimentary canal.

In addition to these advantages Collis Process Pure Dried Buttermilk is the most easily digested of all protein supplements available for poultry feeding. This ease of digestion is especially beneficial to young and growing chicks.



COLLIS Process PURE DRIED BUTTERMILK



WINTER EGGS MEAN BIG PROFITS



STEADY, year 'round egg production is the secret of poultry success. Correct feeding is the chief secret of profitable poultry raising. Large losses in young chicks, failure to get winter eggs, many diseases and other troubles are due chiefly to improper feeding.

The hen manufactures eggs from the feed given her. The number of eggs she can produce depends, a great deal, upon the efficiency of the ration. About 80% of the food she consumes, when in high laying condition, is used for body maintenance and from the other 20% the eggs are made.

The average hen produces approximately one hundred eggs per year weighing around 13 pounds, or $2\frac{1}{2}$ times her own weight. But 200 eggs a year, however, is far more profitable. Heavy egg production depends upon heavy food consumption. The more the hen eats, of the correct ration, the more eggs she can lay and heavy consumption of foods, with buttermilk, is economical. Follow out the feeding suggestions in this book. If it is impossible for the layers to get direct sunlight during the winter months, see that 1% cod liver oil is added to the ration. Cod liver oil is the richest of all known sources in vitamin A. One pint of cod liver oil contains 250 times more of the necessary vitamin A than one pint of butterfat. Without a sufficient quantity of vitamin A, birds stop growing, lose weight and are easy prey to disease. Cod liver oil, too, is the most powerful of all known sources of the anti-rachitic vitamin D. Lack of vitamin D causes leg weakness.

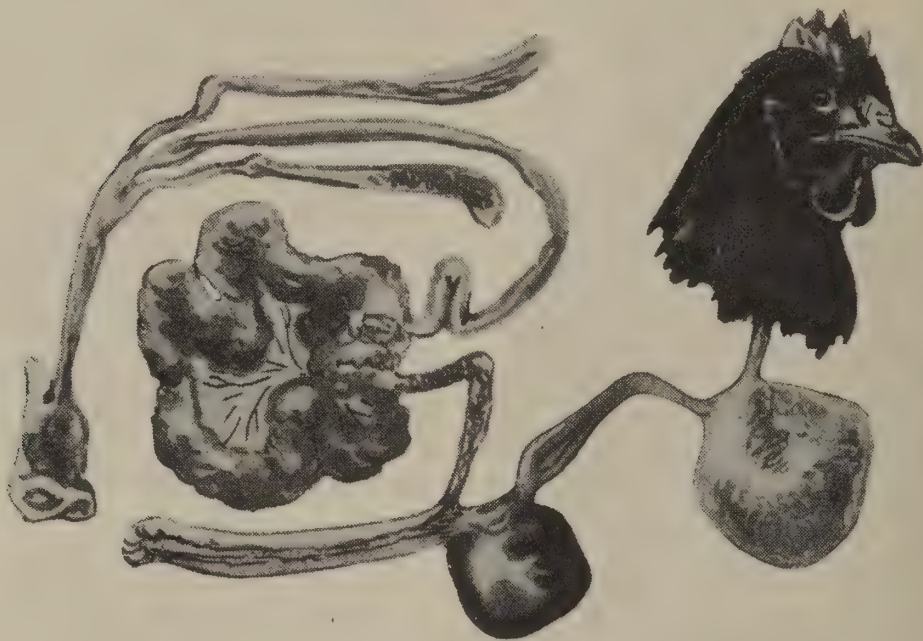
Layers must have light in order to see to feed. The use of artificial light will lengthen the winter days and increase egg production. Strive for more winter eggs to make poultry raising profitable.

Remember also that if houses are too cold, hens will not eat the usual amount of feed. A warm wet mash is sometimes advisable to increase consumption.



THE EGG MACHINERY OF THE HEN

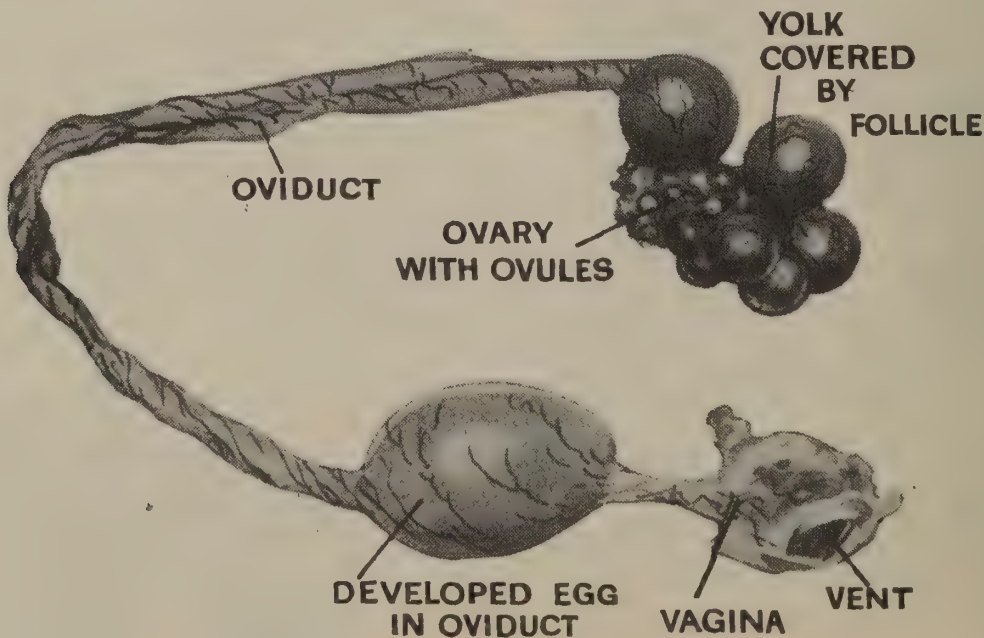
(Courtesy Webb Pub. Co., "Practical Poultry Production")



WHILE discussing the principles and practices of feeding, it will be well to obtain an idea as to how the egg is formed.

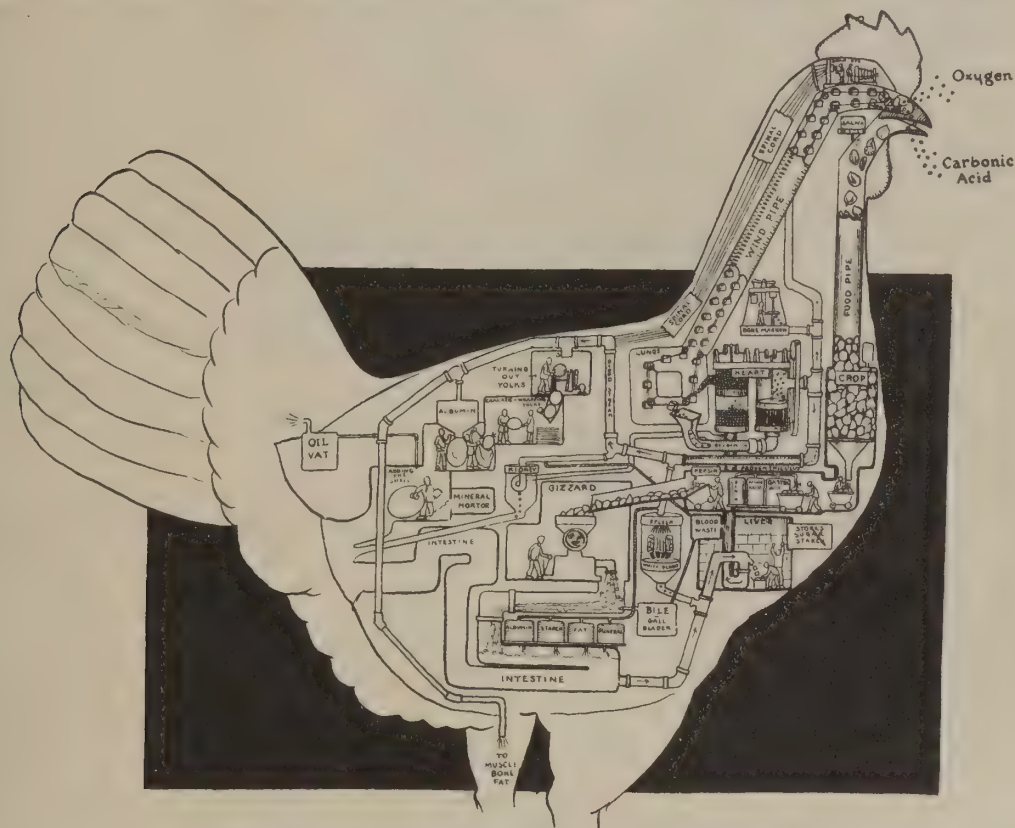
By referring to the illustrations on this page the ovary is shown as containing round follicles, which is the first stage in the development of the egg, and are called the ova, or yolks. The ovum, or yolk, develops in about two weeks, during which time it is enclosed in a sack composed of membrane. While so enclosed the yolk receives by means of the blood the material that composes it.

At the end of two weeks, when the yolk reaches its full development, the membranous sack is broken and the yolk enters the funnel-shaped opening of the oviduct. As soon as the yolk enters, the white of the egg, or albumen, is secreted as the yolk proceeds through the oviduct. After a sufficient amount of the albumen, or white, is secreted to surround the yolk of the egg the secretion of the membranes and shell begins. This will be noted at the lower end of the oviduct canal. This process is completed by the time the egg leaves the uterus, or shell gland, whereupon it passes out through the vent.



THE EGG FACTORY

PROFESSORS Lapp and Bardsley, along with an artist and the United States Egg Society, have produced a novel illustration of the Eighth Wonder of the World. No boiler can make steam without water. Some water makes scaley boilers. So be careful what you feed your layers if you want your layers to feed you.



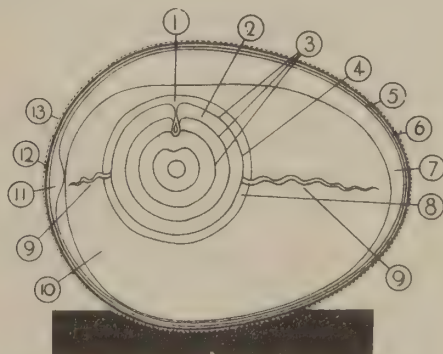
The Finished Product

Every farmer knows that the egg is wet when laid, says the United States Egg and Poultry Magazine. This wetness, or mucous, dries on the shell and has the purpose of filling the pores of the shell without sealing them, thus filtering any air that may pass through the shell. The shell itself, with its two membranes just inside, forms the house of the egg.

Next we come to the egg white and you will see that it is not all of one kind, but is composed of a thick white (albumen) and of a thin or watery white. The thin white is found both inside and outside the thick white.

Next we come to the yolk anchors which hold the yolk in place, called chalazae. They are embedded in the white at either end of the egg. The yolk itself is built up from the centers in layers and is encased in a thin but fairly tough skin called the vitelline membrane. The germ is embedded in the yolk and is visible on the surface of the membrane. The weight of the yolk is so balanced that in whatever position the egg lies the face of the germ is uppermost. To accomplish this the yolk re-

volves on the chalazae, a provision of nature to keep the germ facing toward the body of the hen for warmth.



KEY TO DIAGRAM

- | | |
|------------------|--------------------|
| 1. Germ | 7. } Thin Albumen |
| 2. Yolk | 8. } |
| 3. Layers of fat | 9. Yolk Anchors |
| 4. } | 10. Thick Albumen |
| 5. } Membranes | 11. Air pocket |
| 6. } | 12. Shell |
| | 13. Mucous (Bloom) |

BETTER FEEDING MAKES BETTER LAYING

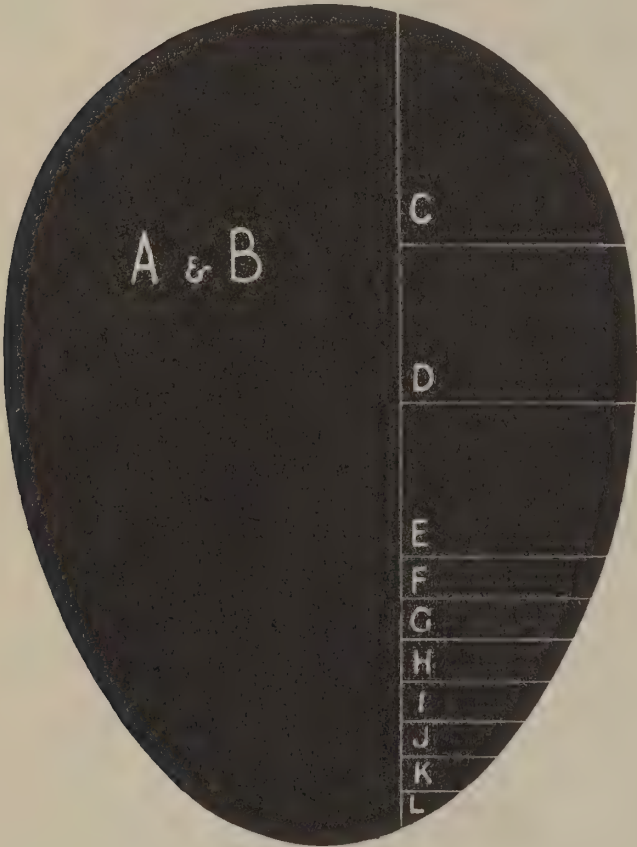


Illustration showing the relative quantity of the different elements in an egg.

- | | |
|---------------------------------------|--------------|
| A. and B. Hydrogen and Oxygen (water) | G. Sodium |
| C. Nitrogen | H. Sulphur |
| D. Carbon | I. Potassium |
| E. Calcium | J. Chlorine |
| F. Phosphorus | K. Magnesium |
| | L. Iron |

BEFORE taking up this subject we should know and understand just from what the egg is made. This can be quickly understood by a glance at the illustration reproduced on this page. Nature will not permit the hen to make an egg if one or any of these elements is absent. This must not be confused with the fact that the hen can make an egg even though some of the elements are slightly deficient in their ratio.

There are two prime requisites for egg producing. The first is obviously a healthy hen. The second is proper feeding.

Nothing is more essential to balance a proper mash feed for the laying hen than buttermilk.

CHECK UP YOUR FEED FORMULAS

If you buy ready mixed feed, be sure to know exactly how much buttermilk is in the formulas you use. In no other way will you know whether or not your poultry is getting enough buttermilk.

Open formula feeds have the formulas printed right on the sack. If you buy closed formula feeds, ask your dealer to find out for you what percentage of that feed is buttermilk.

To be most effective your egg mash should contain 7½% to 10% buttermilk. Your growing mash at least 10% buttermilk. Your baby chick starter must have 15% to 20% buttermilk.

If the feeds you use do not have the above amounts add Collis Process Pure Dried Buttermilk in sufficient quantities to give your poultry the milk it needs.



**"An Egg a Day
keeps the
HATCHET
away"**



FEED DETERMINES EGG PRODUCTION

A PRIZE pullet with a pedigree "a mile long" and from a family of heavy layers if not properly fed will not produce many more eggs than a scrawny undersized scrub hen. Feed is the greatest factor (plus, of course, reasonable care) in determining egg production.

The reason is very simple. The hen must consume the ingredients necessary for egg production before the egg can be formed. There are a great many good commercial laying mashes on the market. You can safely choose any of those which are manufactured by reputable concerns. For record egg production we add 10% of Collis Process Pure Dried Buttermilk to our laying mashes.

You should feed a buttermilk mash which contains at least 10% of Collis Process Pure Dried Buttermilk. It stimulates the appetite and keeps the birds in the best of condition. Hens and pullets in good condition, that are fed a well balanced ration produce more eggs at a lower cost than those that do not have these advantages.

Result Producing Laying Mash

The following mash has given excellent results in many flocks. It is very easy to mix, and the ingredients can be obtained at nearly any feed store:

- 100 lbs. Corn Meal
- 100 lbs. Bran
- 100 lbs. Ground Oats
- 100 lbs. Middlings
- 50 lbs. COLLIS PROCESS PURE
DRIED BUTTERMILK
- 50 lbs. Meat and Bone Meal
- 15 lbs. Ground Limestone
- 10 lbs. Bone Meal
- 5 lbs. Salt

With this laying ration, a scratch feed composed of 50 lbs. Corn, 30 lbs. Wheat, 20 lbs. Oats may be used. The proportion of grain to mash should be varied according to the season, and to the needs of the flock. Never feed more scratch than will be cleaned up before the next feed. Feed one-half as much scratch in the morning as in the evening.



SUMMARY OF RESULTS OF PURDUE UNIVERSITY EXPERIMENT STATION, BULLETIN 258, FEEDING EXPERIMENTS WITH LAYING PULLETS

PULLETS in the liquid buttermilk fed pen laid an average of 164.7 eggs, in the Dried Buttermilk fed pen 189.4 eggs and in the no milk fed pen 56.6 eggs. This indicated a superiority of Dried Buttermilk over liquid buttermilk.

It cost from \$2.16 to \$2.47 to feed a laying Leghorn pullet for 12 months.

It cost an average of \$0.16 for feed to produce one dozen eggs in both the liquid buttermilk and Dried Buttermilk fed pens, and \$0.33 in the no milk fed pen.

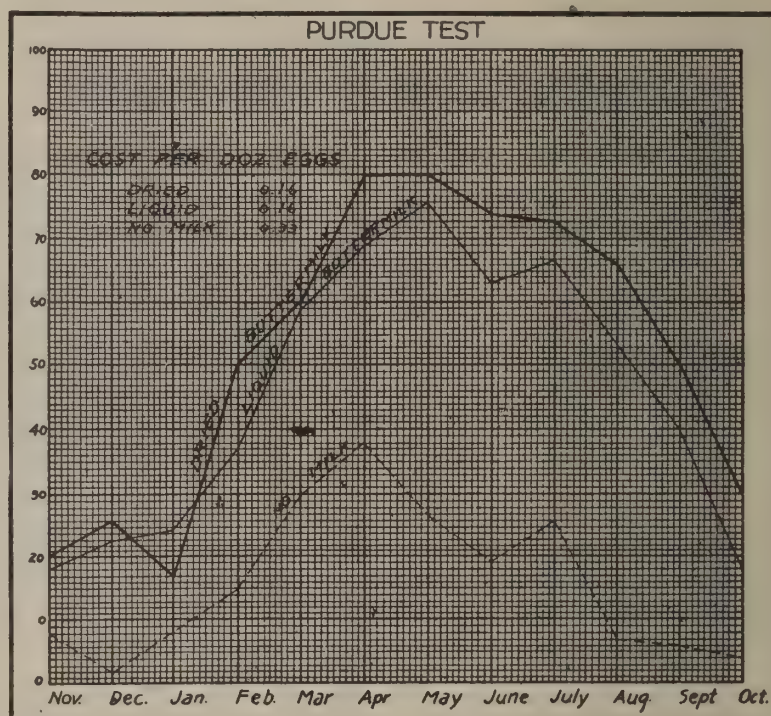
It cost less to feed a pullet when no milk was given, but it cost more to produce a dozen eggs.

The amount of feed required to produce one pound of eggs was 3.56 pounds in the liquid buttermilk fed pen, 3.22 pounds in the Dried Buttermilk fed pen, and 8.61 pounds in the no milk fed pen. The highest producing months, regardless of ration feed, were April and May.

The income from the liquid buttermilk fed pen was \$7.13, from the Dried Buttermilk fed pen, \$8.21 and from the no milk fed pen, \$2.39.

The profit over feed from the liquid buttermilk fed pen was \$4.92, from the Dried Buttermilk fed pen, \$5.69, and from the no milk fed pen, \$0.78.

The feeding value of liquid buttermilk was \$5.00 per hundred lbs. and the

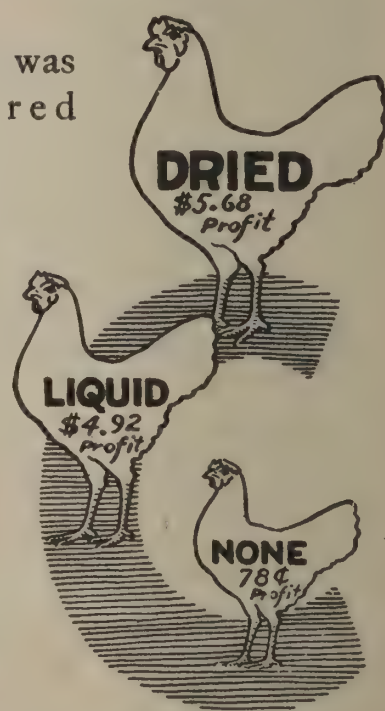


Graphic chart of the results obtained by testing of the effect of feed rations on egg production at Purdue University.

Dried Buttermilk was \$55.10 per hundred pounds.

The Dried Buttermilk pen produced the best fertility of eggs and the liquid buttermilk the poorest. In hatching power of eggs the three pens produce similar results.

The no milk fed pen had the heaviest mortality, but in the milk fed pens it was much alike.



GET RID OF THE ROOSTER

THE ROOSTER has no place in the modern flock after the last setting eggs have been laid.

On most farms and commercial poultry yards roosters are sold as soon as the brooding season is past. This is done where the male birds are not especially valuable. In case they are valuable, making it advisable to retain them, they should be separated from the hens and kept in an individual pen through the Summer and Fall. Only those roosters that are especially good should be saved for next year's breeding.

As a general thing, several roosters may be put in one pen without causing trouble. It must be remembered when culling out the roosters that cockerels invariably give better fertility than older birds. It also must be remembered that the feed roosters will eat before the next season will go a long ways toward buying a vigorous cockerel in the Fall.



Don't run the risk of keeping roosters with the flock over the Summer if you expect to get a good price for your eggs. Don't forget that an infertile egg will never show blood lines nor will it develop a large germ spot on the yolk.

MORE ABOUT EGG SIZE

It must be remembered that the size of the egg is an inherited factor. If the pullet has inherited the small egg factor, nothing can be done in the way of feeding that will enable her to lay a larger egg. The very best of feeding cannot cause her to lay an egg larger than the size she has inherited.

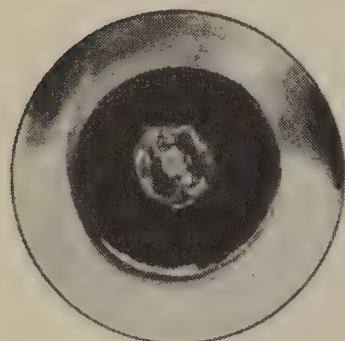
But there is grave danger of her laying a much smaller egg than her inherited size. A pullet may be fed so badly during the rearing period that she may become stunted in development and this

will apply equally to her body development and to that of her reproductive organs so that many of her eggs may be small in size.

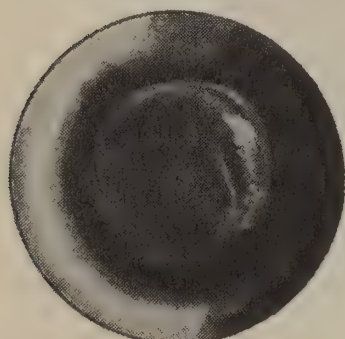
On the other hand pullets may be forced to such an extent that they will lay before reaching maturity. Such pullets nearly always lay small eggs.

University of Idaho Agricultural Experiment Station, Department of Poultry Husbandry, has an interesting bulletin (No. 134) on this subject.

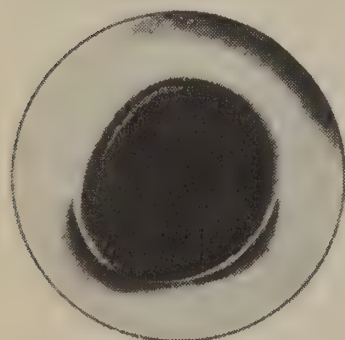
INFERTILE EGGS ARE BEST FOR MARKET



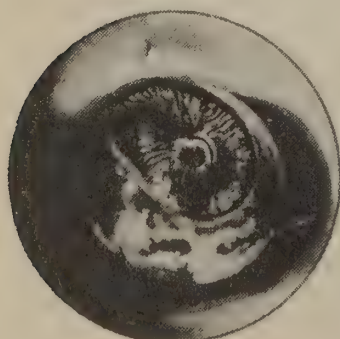
*Fertile Egg After 24
Hours at 103° F.*



*Fertile Egg After 36
Hours at 103° F.*



*Fertile Egg After 48
Hours at 103° F.*



*Fertile Egg After 72
Hours at 103° F.*

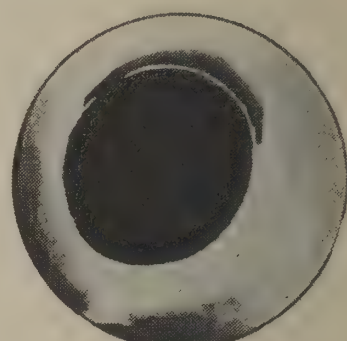
MARKET prices can usually be “topped” when infertile eggs are offered. An infertile egg is one which is produced by a hen which has not been in a flock with a male bird for at least 21 days. Three weeks is all the time necessary for eggs to become infertile after the male bird has been removed.

The male bird has no effect upon the egg laying ability of a hen. Pullets and hens will lay just as many eggs if they are removed from male birds as they will if allowed to run with them. The rooster merely fertilizes the germ of the egg and thereby makes a hatching egg. For choice market eggs—keep male birds away from layers.

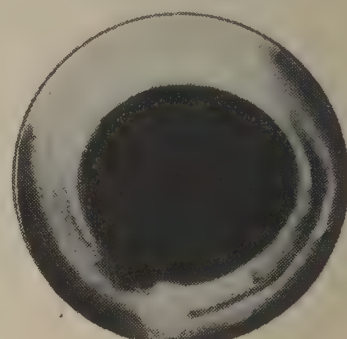
**FERTILE EGGS
COST THE
FARMER
\$15,000,000 EACH
YEAR**

Governments experts estimate the loss through fertile eggs at \$15,000,000 per year. The farmer pays this!

In hot weather the germ in the fertile egg quickly forms a blood ring which spoils the egg for food or market. This loss can be avoided by simply keeping male birds away from layers.



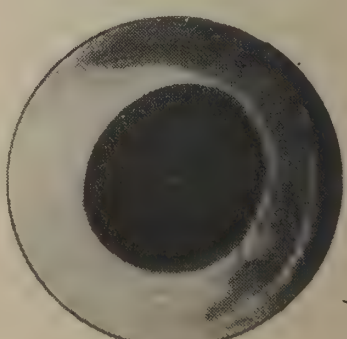
*Infertile Egg After 24
Hours at 103° F.*



*Infertile Egg After 36
Hours at 103° F.*



*Infertile Egg After 48
Hours at 103° F.*



*Infertile Egg After 72
Hours at 103° F.*

HIGHER PRICES ARE PAID FOR GRADED EGGS

EGGs on the large markets are separated into numerous grades. Of course such an elaborate system of grading cannot be practiced by the average farmer, but top prices may be obtained by using a little care and judgment in sending only the best eggs to market.

Grade your eggs as to:

- | | |
|----------|---------------------|
| 1. Size | 3. Cleanliness |
| 2. Color | 4. Interior Quality |

Eggs should be graded into two sizes: 18 to 22 ounces to the dozen, and over 22 ounces to the dozen. This last grade must average 24 ounces to the dozen. The size, color and shape of the egg may be increased by selecting the breeding stock for these factors.

Do not sell abnormal shaped eggs, but keep them for home consumption. Long eggs, eggs that are large in circumference and other abnormal shaped eggs usually break before reaching market, or if they do not, they lend the appearance of non-uniformity to the rest of the eggs.

Eggs should be graded according to color. On the large markets they have white eggs and several shades of brown, but the grades for practical use on the farm should be white and brown.

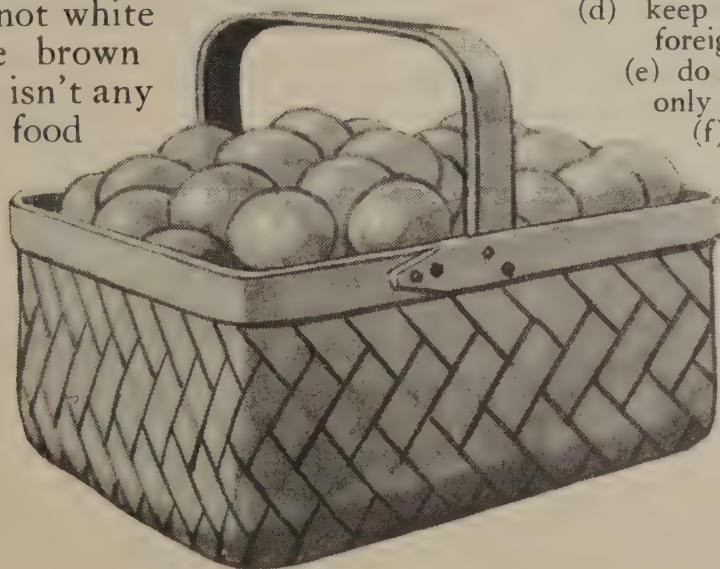
Every egg that is not white should go in the brown class. There really isn't any difference in the food value between a white and brown egg, but most markets pay a premium on white eggs and some pay a premium on brown eggs. A good example of this is that the New

York market gives preference to white eggs, while the Boston market gives preference to brown eggs.

To get top prices eggs must be clean. To have good clean eggs the nests and the house must be kept clean. Here is one of the advantages of having sandy soil as the birds' feet do not get so muddy during wet weather and they do not carry all of this mud into the house and nests. Do not let your chickens roost in the nests and get them full of droppings. To have the best quality eggs candle them and remove all blood rings, meat spots, bloody eggs, blood clots, heated eggs, etc.

The following are the principal essentials to get the top price for eggs:

1. Uniform size.
 - (a) grade as to size.
2. Uniform color.
 - (a) grade as to color.
3. Cleanliness.
 - (a) keep nests clean.
 - (b) do not let chickens into muddy yards.
4. Interior Quality.
 - (a) have only infertile eggs.
 - (b) gather eggs at least two times daily during the summer.
 - (c) keep eggs in cool dry place (preferably 40 degrees F.)
 - (d) keep eggs in a place free from foreign odors.
 - (e) do not wash eggs. (Wipe them only with a damp cloth.)
 - (f) candle the eggs.
 - (g) do not sell eggs found in a stolen nest.
 - (h) sell eggs at least two times a week.
 - (i) cover eggs on way to market.



Be sure to keep all small, dirty, misshapen eggs and eggs from stolen nests at home.

FARM GRAINS CANNOT SUPPLY ALL FOOD ELEMENTS



FARM grains do not supply all the food elements necessary for correct feeding. Sometimes we find the "know it all" poultry raiser who maintains that nature will take care of the chicks and that nature has placed on earth all the necessary material essential to chicken life. This class of poultry raiser goes further and argues that nothing is to be gained by scientific poultry feeding.

It is quite true that there is enough protein, carbohydrates, fats and vitamins available on the free range. But who, in this day and age, can raise chickens profitably and allow them to roam the four corners of the globe? Under existing conditions where we now carefully breed our poultry, mate with unusual care and strive in every way to secure the maximum egg production, we must in turn, give to the poultry the food values so essential to health, maturity, and laying. This can only be supplied through correct feeding, which now consists of established formulas and rations, including the correct amount and kind of protein, minerals and vitamins. That the farm grains alone will not supply these essential elements which are so necessary can be fully appreciated by turning to page 60 of this book and noting the composition of the various kinds of grain. Cereal grains are extremely low in mineral matter, especially calcium, chlorine, phosphorous. Chickens need the calcium and phosphorous for bone building, a generous supply of which aid in keeping down leg weakness. Chlorine is the important element which is needed to assist the digestive organs of the chicken.

The vitamins are greatly lacking in most of the cereal grains. Vitamin "A," "B" and "C" are generally plentifully supplied by greens and milk, although Vitamin "C" is not needed by chickens and is most abundantly found in juice of fruits, such as oranges, lemons and tomatoes. Vitamin "B," which is quite essential to growth and maturity, is also fairly well supplied by green foods and milk. Vitamin "D" is one of the most important in chicken raising. This vitamin is generously supplied by cod liver oil. Two additional vitamins have been discovered, but their properties have not been thoroughly worked out up to this time.

Milk is undoubtedly one of the most effective foods for supplementing the deficiencies of other substances. (Journal of Dairy Science, January, 1923.) Skimmed milk contains all the food value and food elements of fresh milk except the butterfat, which, of course, carries the highly important vitamin "A." For that reason, skimmed milk alone is insufficient.

Collis Process Pure Dried Buttermilk contains all the proteins, vitamins and minerals of liquid buttermilk (calcium and phosphorous being especially high). The only difference between Collis Process Pure Dried Buttermilk and fresh buttermilk is that in the former the water has been removed. There is no justification for selling and shipping hundreds of miles a product which contains a heavy percentage of water. Water is free and the poultry raiser has no inclination to buy water. Therefore, Collis, through its special patented and highly developed process, removes the water from the buttermilk, leaving only the valuable health giving, bone building tissue strengthening elements of the pure milk solids.



PREVENTING THIN SHELLED EGGS

WHERE the laying of soft or thin shelled eggs is a condition general to the whole flock, even when high grade limestone or oyster shell is supplied, the lack of direct sunshine may be the cause.

The ultra-violet rays of sunshine improves the texture of the egg shell. Where direct sunlight is impossible cod liver oil should be resorted to.

Collis Process Pure Dried Buttermilk, with cod liver oil, aids in the assimilation of lime and phosphorus very much like the ultra-violet rays of the sun.

Many soft or thin shelled eggs are laid by birds that are too fat. The muscle movement of the oviduct is hindered by layers of fat. Excessive fat weakens the functions of the glands secreting the shell material. A change in feeding is necessary.

LACK OF SHELL MATERIAL

A hen requires practically $3\frac{1}{2}$ pounds of lime for the manufacture of 200 egg shells. If there is any lack of lime that part of the oviduct which manufactures the shells fails to do its work properly.

Shell-forming material such as oyster shell and limestone should be kept before the hens at all times. Leading poultry authorities are recommending some limestone grits because of their

calcium carbonate content. Limestone grits should be free from magnesium compounds.

FORCED PRODUCTION

Forcing the flock too much for production is sometimes the cause of soft or thin shelled eggs. The yolks in the oviduct follow each other so quickly that the one is forced too rapidly to allow for sufficient time to put on a normal shell covering. A dose of Epsom salts will often cause this condition.

Scouring often results in soft shelled eggs. Excessive feeding of beets, mangles and cabbage will sometimes cause scouring.

OTHER CAUSES OF THIN SHELLED EGGS

When thin or soft shelled eggs are not a general condition some temporary causes are frequently responsible.

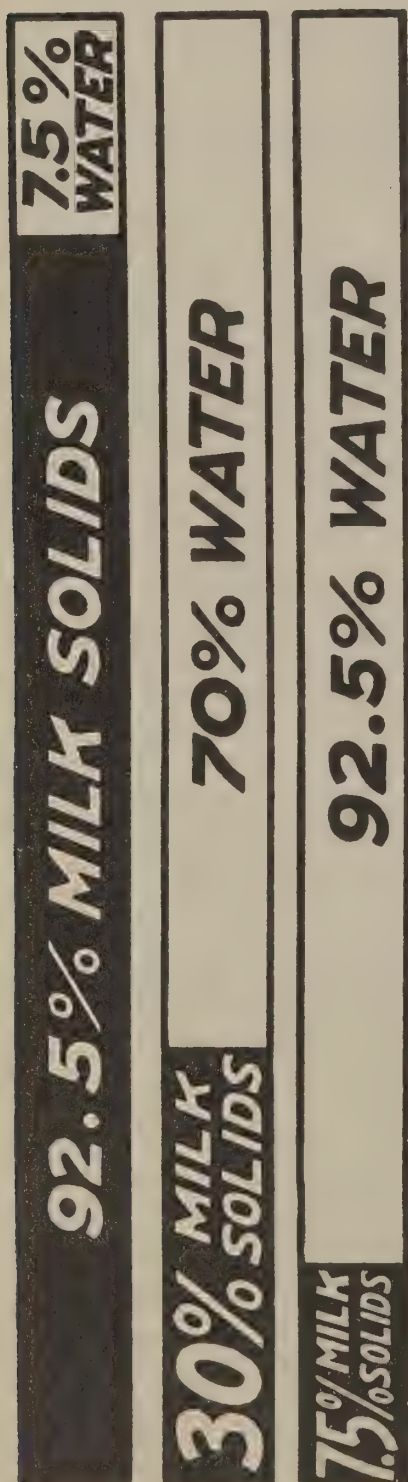
Hens often become frightened and drop an egg before the shell is completed.

Irritation of the oviduct as a result of inflammation may be the cause. There is no cure for this condition and the bird laying these abnormal eggs should be killed.



BUTTERMILK IN ITS MOST ECONOMICAL STATE

THE IMPORTANCE of buttermilk in feeding is almost a foregone conclusion. No man who has carefully studied the impartial and unbiased tests made by government experiment stations and agricultural schools needs no further proof of the fact that buttermilk plays a very important part in the correct feeding of poultry.



It only remains to decide which form of buttermilk is the most economical. Occasionally, we find a user of buttermilk who, otherwise a shrewd, careful buyer, is misinformed on the subject of buttermilk costs.

Collis Process Pure Dried Buttermilk is pure buttermilk with nothing removed but the water. It is as dry as it is humanly possible to make it and contains only $7\frac{1}{2}\%$ moisture. In other words, out of each 100 pounds of Collis Process Pure Dried Buttermilk $92\frac{1}{2}$ pounds is pure milk solids and only $7\frac{1}{2}$ pounds is moisture.

In order to demonstrate the economy of buying only dried buttermilk these figures on Collis Process Pure Dried Buttermilk should be compared with the analysis of other types of buttermilk. This can best be realized by a study of the chart to the left. The black solids in this chart represent the milk solids in buttermilk. Note that Collis Process Pure Dried Buttermilk (the one marked $92\frac{1}{2}\%$ milk solids) contains over three times as much milk solids as condensed buttermilk (marked 30% milk solids) and contains almost twelve times as much milk solids as liquid buttermilk.

The money value of buttermilk is found only in milk solids. There is ample clean, fresh water on every farm. Therefore, in the purchase of buttermilk, the greatest economy comes through buying only milk solids with all water removed. Here are the contents of the three available forms of buttermilk.

	Water	Milk Solids
1. Liquid buttermilk.....	92.5%	7.5%
2. Condensed buttermilk.....	70. %	30.0%
3. Collis Process Pure Dried Buttermilk.....	7.5%	92.5%

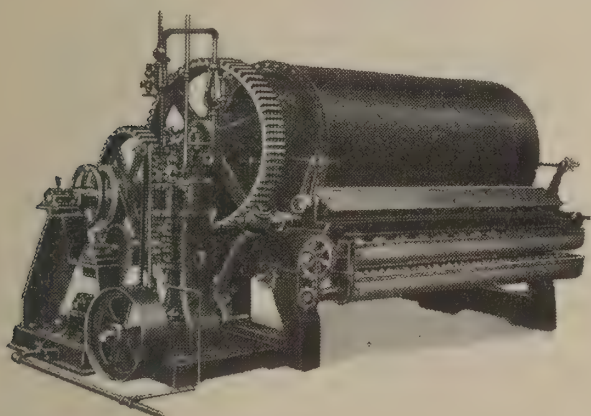
Buttermilk should be bought on the basis of price-per-pound-of-pure-milk-solids—not on a price per pound of bulk. Buying on a milk solid basis eliminates the water as a factor in the price. In other words, each 100 pounds of Collis Process Pure Dried Buttermilk contains $92\frac{1}{2}$ pounds of milk solids. In figuring the cost, price per pound must be based on the $92\frac{1}{2}\%$ of solids with all water eliminated. This same method of figuring should be used in finding the cost per pound of milk solids in all other forms of buttermilk. Water is not a factor entering into the price. Purchasers of buttermilk should pay for milk solids, not water, and should pay freight only on milk solids.

Collis Process Pure Dried Buttermilk is the true and economical form of milk solids. It is sold at a price which, when feeding values are compared, is inexpensive and economical.



THE COLLIS PROCESS OF DRYING BUTTERMILK

THE Collis Process of drying buttermilk consists of removing 92% of the water from normal, clean buttermilk in order to make a product that may be kept for long periods without spoiling, one that will mix easily with other feeds and one that may be transported economically. Thus, we make buttermilk available to all regardless of their distance from a creamery.



In perfecting our process, particular care has been taken that the buttermilk solids shall reach the consumer with all the special feeding value of liquid buttermilk.

Our process is so regulated as to prevent the loss of food elements or the development of undesirable products through fermentation. The milk is at all times kept thoroughly agitated and at no time is anything removed other than water. The buttermilk from the churns is received into hauling tanks or piped direct to our storage vats. From our vats it is pumped to the driers. In the storage vats, as well as in the pans of the driers, the milk is kept thoroughly agitated, assuring an even disposition of the food elements throughout the finished product. The buttermilk is sprayed onto a steam heated roll. A very thin film adheres to this roll, resulting in very rapid evaporation of the moisture. The temperature to which the liquid buttermilk is heated at no time exceeds 200 degrees F. The time of exposure is 30 to 40 seconds. The

roll revolves toward a stationary knife, which removes the milk solids which at this stage resemble tissue paper except that they are still quite moist.

From the knife this partially dried buttermilk passes over an apron and into a conveyor which carries the product to a basket. In traveling from the knife to the basket the last of the moisture to be removed is given off to the atmosphere. The dried buttermilk is then run through a mill which reduces the product to the granular form in which it reaches you in our special moisture-proof, paraffined paper-lined burlap bags. Nothing has been added and only water removed.

Wisconsin Bulletin 342, which reads as follows:

"Skimming milk removes the greater part of vitamin A so that skimmed milk does not provide an animal with a sufficiency of this necessary food constituent.

"Vitamin B is a very stable compound. Nothing that can be done to milk while it still preserves much of its taste and appearance is liable to decrease the amount of this vitamin. Sterilizing, drying, and condensing milk do not affect the ultimate content of vitamin B.

"Vitamin C, about which we should be chiefly concerned when evaluating processed milk for its vitamin content is partly destroyed by pasteurization, especially where the milk is agitated and aeration results. Sterilization under similar conditions destroy it completely. Milk powders differ considerably. Those dried by the roller process are fairly efficient."

Journal of Biol. 30, 115 (1917) Hogan found that heating casein (the principal protein of milk) to 290 degrees F. did not materially affect its nutritive value. Dried Buttermilk is heated to only 190 to 200 degrees F.





THE COLLIS EXPERIMENT FARM



Showing a section of the Collis Products Company's Experiment Station.

THE COLLIS Products Company is not content to only manufacture and sell dried buttermilk—it goes much farther by maintaining a poultry experiment station where poultry feeding, rations, diseases, breeding and other similar subjects, pertinent to poultry husbandry, are scientifically studied under the watchful eyes of experienced poultry experts.



Hundreds of baby chicks are raised each year. These are divided into groups and each small group is fed a different ration. A carefully tabulated check, taken at intervals, furnishes remarkable data on which to establish authentic feeding advice and suggestions.

This valuable information gained through actual experiments is passed on to users of Collis Process Pure Dried Buttermilk in the form of suggestions that make for better, more profitable poultry.

THE COLLIS EXPERIMENT FARM



THIS EXTENSIVE work requires the investment of much time and money. The Collis Products Company does not benefit from this work in any way other than to give its customers, and the users of Collis Process Pure Dried Buttermilk, the benefit of the exhaustive research being continually carried on at the Collis Experiment Farm. This experimental work does not stop with the baby chicks. Another group of experts work with pullets and hens. As feeding is the key to egg production the Collis Products Company scrutinizes with great care the results of different feeds, rations and formulas.



Scene on Collis Experiment Farm—showing two different groups of pullets.



GUARANTEE

WE GUARANTEE that 1 lb. of Collis Process Pure Dried Buttermilk equals in feeding value $3\frac{3}{10}$ lbs. of Condensed Buttermilk or 12 lbs. of Liquid Buttermilk of average solid content. We furthermore guarantee that Collis Process Pure Dried Buttermilk contains all the Lactic Acid present in the Fresh Liquid Buttermilk from which it is made and that all the feed value of the original is retained.



Collis Products Co.
Clinton, Iowa.

HERE IS
THE
GUARANTEE



and HERE IS THE
PROOF

**COLLIS PROCESS
PURE
DRIED BUTTERMILK**

BULLETIN 1052

U. S. Department of Agriculture
Bureau of Chemistry

Form of Buttermilk	Per cent of Water	Per Cent of Milk Solids
Liquid	92.50 %	7.50 %
Condensed	71.38 %	28.62 %
Dried	7.74 %	92.26 %



THE NEED OF MILK SOLIDS AND LACTIC ACID

MILK is the most complete natural food we have. The value of milk as a feed for growing stock is not to be questioned. All leading feeders use milk as an aid to better results.

Dried Buttermilk contains all the milk solids of fresh buttermilk and has an equal feeding value, pound for pound, of solids. Dried buttermilk has been successfully used in the feeding of horses, calves, dogs, swine, foxes, ducks, geese and turkeys, as well as poultry feeding in all stages such as, starting, growing, laying, breeding, and fattening.

The value of milk solids is due largely to the fact that the proteins are of the highest quality. The proteins are the most complete that we have, and supplement grain feeds in a most efficient manner. The proteins of milk go farther than proteins from any other source.

The minerals of milk are the best bone building minerals available. The minerals of milk are deficient only in iron, but this essential mineral is contained in the common feeds and in drinking water. The young are born with a sufficient supply of iron to tide them over until iron carrying food is taken.

Milk contains the vitamins, fat soluble A, water soluble B, water soluble C, and factor X. Milk is deficient only in vitamin D. (For details of these vitamins see article "Farm Grains do not supply all the Food Elements Necessary for Correct Feeding.")

The carbohydrate of milk, (lactose) milk sugar, is easily digested and assimilated, furnishing heat for the body. Besides furnishing heat, lactose or milk sugar has a beneficial effect on the digestive system, making conditions in the intestines favorable for the growth and multiplication of non-putrefactive bacteria.

This condition is unfavorable for the growth and multiplication of the putrefactive or detrimental bacteria, which cause digestive disorders. Milk does not carry any fibre. This fact is important in the feeding of young stock. Young animals and birds cannot handle much fibre.

Milk is practically 100% digestible. This ease of digestion is an important item, especially with young stock. The fact that it is practically all digested lowers the cost of the high priced protein.

The lactic acid content of buttermilk is a great aid in digestion, and serves as a stimulant for a greater food consumption. Sour milk feeding has a most beneficial influence on the growth of chicks, and in lessening mortality from all causes. J. R. Beach and J. C. Carl of the Division of Veterinary Science, University of California, found that buttermilk was a good controller of coccidiosis. They say, "The constant feeding of buttermilk with the diet otherwise restricted appears to be an effective means of controlling outbreaks of coccidiosis."

"Feeding sweet skim milk or solution of condensed whey also appears to have considerable although less marked value." See pages 16, 17.

POULTRY YARD PROBLEMS SOLVED

BREEDING birds that are not strong and vigorous should be weeded out without pity and without consideration to their cost. Sickly, weak male and female birds mean weak chicks which are a danger to healthy ones.

Breeding pen during the winter should be small so that the birds in it will throw enough heat to keep all of them sufficiently warm. Birds that are cold cannot fill the egg basket but they can empty the pocketbook. Deep litter kept clean, in which the evening scratch is scattered, is an aid to keeping the fowls warm. In very cold weather it is a good idea to scatter just a little grain in this litter several times a day for the same purpose. Mash consumption can be increased on cold days by feeding warm.

If you cannot give your breeding birds green food and direct sunlight, see that they get leafy alfalfa hay and cod liver oil. Collis Process Pure Dried Butter-

milk is also a big factor in greater fertility in the eggs.

Leg weakness is another danger in the early stages of chick raising. Direct sunshine, that is, sunshine unfiltered through glass, will prevent this and if direct sunshine is not possible then cod liver oil should be fed in the mash. Collis Process Pure Dried Buttermilk is also a material aid in preventing leg weakness.

Worms constitute another danger. The best way to prevent worms is to keep the young stock in a healthy, vigorous condition by proper feeding, correct housing and exercise and a generous supply of Collis Process Pure Dried Buttermilk. Keep their sleeping quarters clean. Feed dried buttermilk in the mashes. The lactic acid in dried buttermilk increases food assimilation and helps keep the alimentary canal free from intestinal parasites.





MATING AND BREEDING

TO OBTAIN the greatest assurance of fertility in hatching eggs, the mating should be accomplished at least two weeks before beginning to save eggs.

Some breeders like to try out a few eggs before selling them for hatching. This is done to make certain that the eggs are fertile, but it is not necessary. Sterility is not very common in male birds. If the rooster is placed in the pen with the hen two weeks before saving the eggs it is most likely that good fertile hatching eggs will be produced.

AGE OF MATING STOCK

It is better to use hens as breeders. Pullets as a rule are not mature enough by the breeding season to be used as breeders. However, early hatched pullets that are held out of production until fully grown may be used. Pullets lay smaller eggs, the chicks are usually smaller, grow slower and are weaker in vitality. There are exceptions to the above, however. Early pullets are often used as breeders, but

as a rule it is much better to use hens.

As a general rule, hens over three years begin to give poorer results than younger birds.

Well developed cockerels can be mated to hens to good advantage. Pullets, if used, should be mated with cock birds.

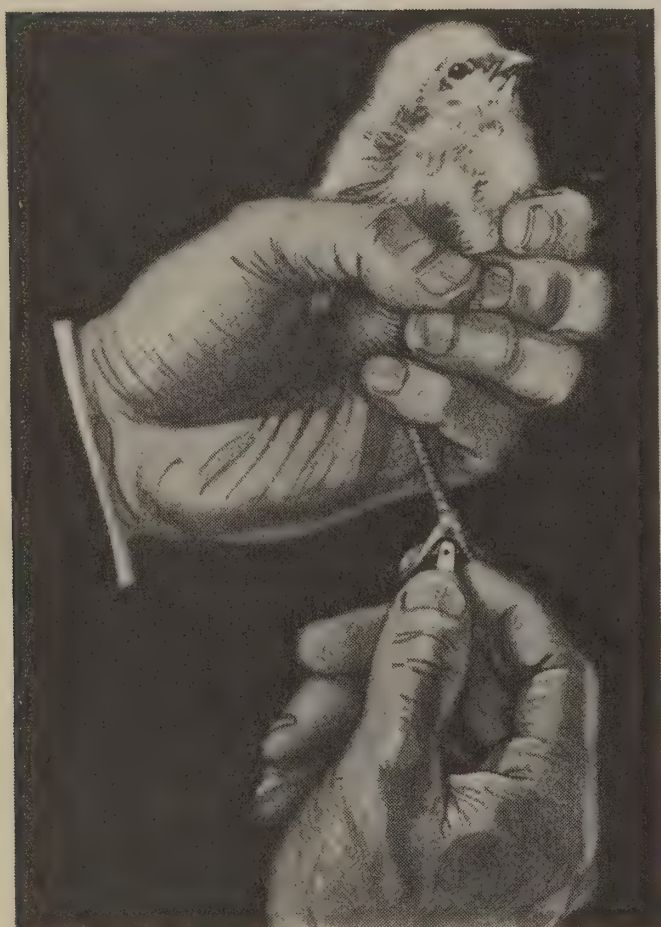
Breeding fowls (both male and female) which have proved their value should be retained as breeders as long as they produce good results.

SIZE OF MATING

The size of the mating is to some extent dependable upon the breed. If fowls are yarded 15 to 25 hens of lighter breeds (such as Leghorns) may be placed with one male bird.

General purpose breeds (such as Plymouth Rocks) one male bird should be placed with not more than 10 to 15 females. With the heavier breeds, keep the number of hens with one male down to about 8 to 10 females.

CARE AND FEEDING OF BREEDING FLOCK



THERE IS an almost unbelievable amount of difference in the vitality of chicks hatched from eggs layed by well matured hens in the flock and those hatched from eggs picked at random. Some of the latter come from young, immature pullets.

In case a special breeding flock is found to be inadvisable, one of the poultry houses may be divided off—one end for the laying birds and the other end for the breeders. Instead of building separate pens for the two flocks they can use the free range on alternate days.

1	▲	▲	9	⊙▲	⊙▲
2	⊙▲	▲	10	⊙▲	⊙▲
3	▲	▲	11	⊙▲	⊙▲
4	▲	⊙▲	12	⊙▲	⊙▲
5	▲	▲	13	⊙▲	⊙▲
6	⊙▲	▲	14	▲	⊙▲
7	▲	⊙▲	15	⊙▲	⊙▲
8	▲	▲	16	⊙▲	⊙▲

Chicks from 16 different hens can be marked by toe-punching according to the above combinations.

It has been demonstrated that restricted ranging for the breeders is a common cause for high mortality among the chicks. It also reduces the hatchability of the fertile eggs due to the lack of vitality in the eggs when the parent stock has been subject to confinement. This trouble is due to faulty nutrition, in other words the ration does not supply all of the hens' needs.

BREEDING PENS

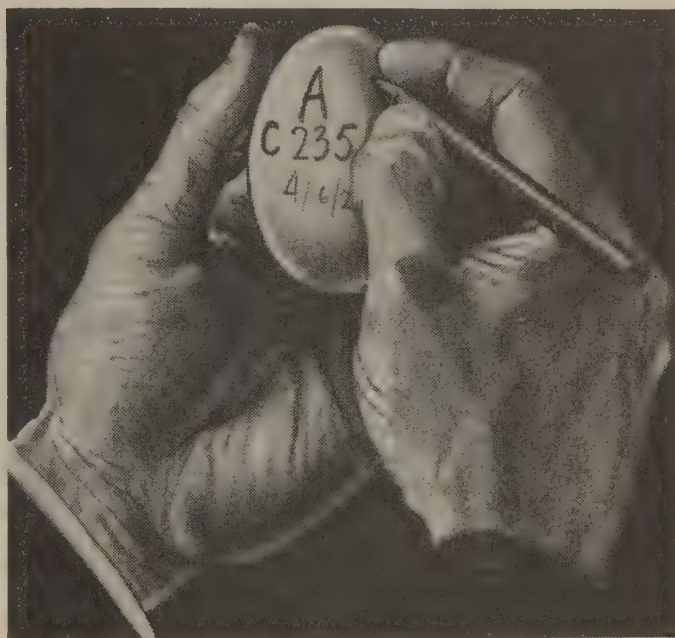
Special breeding pens should not be made too small. When the breeding pen is too small the fowls cannot get all the green food required. Special breeding pens should be sowed to wheat or rye in the Fall so that ample green food is available. If it is necessary to keep breeders confined you should add 10% of bright green alfalfa meal and 2% cod liver oil to the ration.

It also must be remembered that the less vegetable and green food provided for the fowls the more Collis Process Pure Dried Buttermilk should be given.

Cockerel an Important Factor

Always remember that the cockerel is half the flock and he cannot be too good. Only the very best layers should be permitted to rear cockerels for use in main breeding pens. It seems to be agreed that the high producing hen sends her laying character down to future generations through her sons.

If you wish to raise your own cockerels select eggs from your best

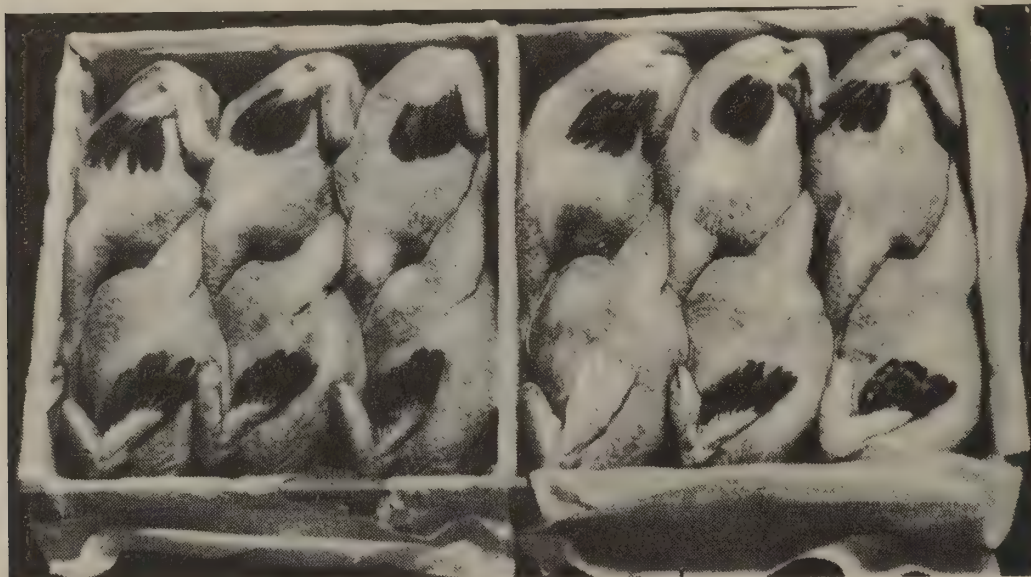


Marking eggs from which to select cockerels.

hens, type and production both being considered. Select the cockerels for form and color.

In raising cockerels it is important to check up your feed formulas. To be most effective your baby chick starter must have 15% buttermilk. Your growing mash should contain from 7½ to 10% buttermilk. Your layers, in producing eggs for cockerels, should get 10% buttermilk in the egg mash. If the feeds you use do not have this much buttermilk add Collis Process Pure Dried Buttermilk to give your poultry the milk it needs.

FATTENING FOR MARKET



THERE is, in every farm flock, chickens that it does not pay to keep. These are hens that are non-layers and whether kept for egg production or breeding purposes their characteristics show plainly that they would never be profitable.

When hens are culled, these non-layers, if not overly fat, can be fattened and profitable gains made if they are fed for seven days. Use the ration given here and follow the directions. Feed the young cockerels before marketing. The old cock birds can be softened up and their flesh made more tender by confining them and feeding for three or four days.

Broilers should be fed fourteen days before they are marketed. This can be done successfully. Put the broilers in a feeding crate, or if no feeding crate is available, confine them in small pens, feeding them the ration given below according to directions. Broilers handled in this way will repay one for the extra work and when sold, show a profit over cost of feeds used.

The following formula will answer for a general fattening feed for all chickens on the farm:

Corn Meal.....50 lbs.
Ground Oats or Oat Meal (Oats should be very finely ground) ..25 lbs.

Flour Middlings.....25 lbs.
Collis Process Pure Dried Buttermilk.....16 lbs.

Feeding Directions

Follow the directions given here as closely as possible.

DIRECTIONS: Mix two and one-half parts of water to each one part of feed. See that this is thoroughly mixed. Feed as much of this mixture as the chickens will readily clean up. Feed three times daily. See that chickens eat all feed given them.

Do not give the chickens water to drink. The feed contains enough. Mix feed the night before for the following day. Feed broilers and springs ten to fourteen days. Hens and young cocks seven days.

The fattening formula can be changed around to suit your conditions but under no circumstances should you use less than 16 pounds Collis Process Pure Dried Buttermilk to each 100 pounds of the grain ration.

There is no substitute for milk. Without it the gains would not be high nor would the quality of the fattened chickens be as good.

CAPONS BRING HIGHER PRICES

DID YOU ever eat roast capon? If you have, you will know why capons demand a higher market price than broilers or cockerels. A capon is a male chicken after the sex glands have been removed. The operation, called caponizing, is performed when the bird is from two to four months old and weighs from $1\frac{3}{4}$ to 3 pounds. Space will not permit giving the details of the operation. A very complete description is found in Farmers Bulletin 849 which may be obtained free from U. S. D. A. The purpose of the operation is to produce a bird which will be of quiet disposition and hence grow and fatten more rapidly and economically. A secondary result will be a bird with sweeter and more tender meat which factors account for the higher market price.

To bring the best prices capons should weigh from 8 to 12 pounds, and should be marketed from December 15 to March 15. In order to reach this market birds must be grown rapidly, and marketed in a well fattened condition.

A liberal supply of milk in the ration will help greatly to produce these results.

As soon as the birds have been operated upon, they should be given a light feed of equal parts of Corn Meal, Wheat Bran, Flour Middlings, and Collis Process Pure Dried Buttermilk. This may best be fed mixed to a heavy batter with water. Three such feeds a day may be given for three days, gradually increasing the amount fed. On the fourth day, they may be returned to the growing mash given on page 20. As the capons get older the amount of corn in the ration should be increased, either in the mash or as replacing other grains in the scratch feed.

Capons do best on range which supplies plenty of succulent green feed. After

they are confined in early winter, they should receive sprouted oats, mangel or cabbage.

During the last two weeks before selling, they should be crate fattened according to directions given on page 44.

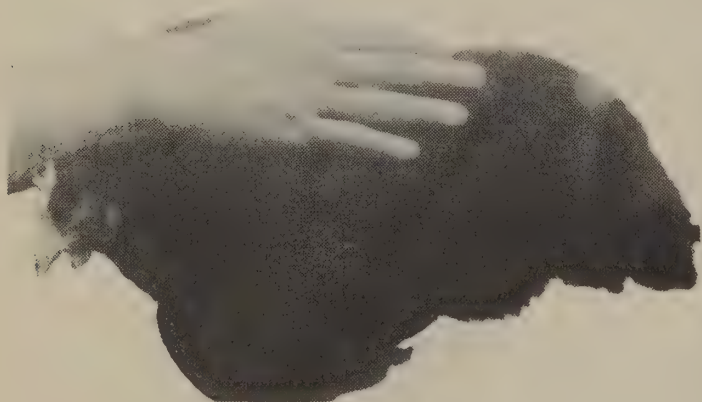
Capons will stand heavy feeding better than other classes of poultry, and every effort should be made to increase the amount of feed consumed. Since milk adds to the efficiency of any ration, and since it improves the quality of flesh, be sure that capons receive a liberal supply of COLLIS PROCESS PURE DRIED BUTTERMILK in all their feeds.





Showing the Correct Method of Holding a Chicken

The hen is held with the left hand, keel bone resting on palm, index finger between hock joints, thumb and third on outside of hock joints. Head under arm. This method keeps hen under control and leaves right hand free to work.



Measuring the Length and Width of the Back

Place heel of the hand at the base of the neck, getting length with the fingers. At the same time measuring width with the number of fingers on the back and the space between them. Want a good long, wide flat back.



Showing How to Measure the Width of the Back

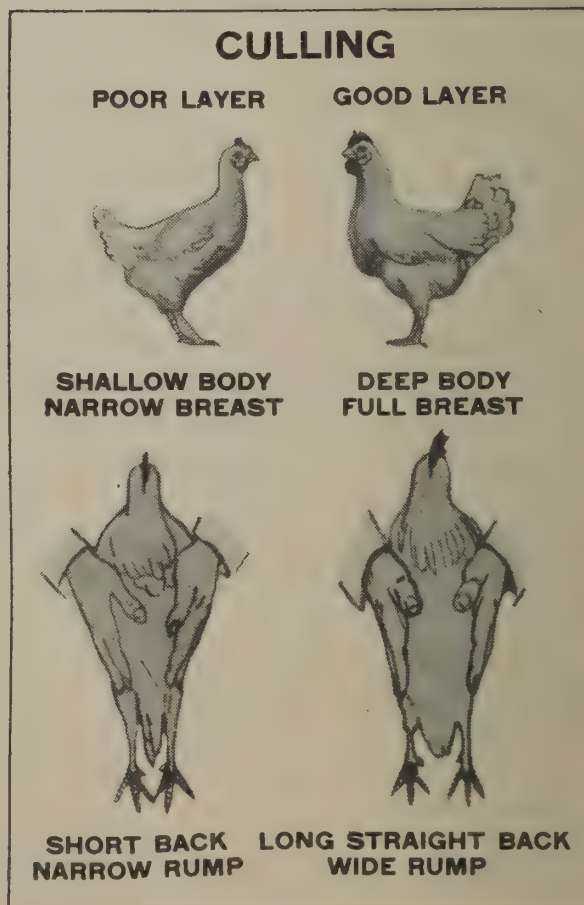
Hen held with left hand. Width of back measured with thumb and index finger of right hand. Place hand on bird at hip joints with thumb and index finger extended downward. Slide hand back towards tail. Want a wide flat back which carries the width back to the tail.

CULLING THE FLOCK

No phase of poultry husbandry has proved as great an achievement as that of being able to tell by certain physical characteristics the egg-producing abilities of a hen.

By this method, poor layers can be separated from the producers and non-layers marketed. Poor layers eat as much as good layers and they require just as much care. Obviously, if a flock of hens is going to be marketed, it should be culled first so as to save all high producers.

In the illustrations on these two pages some of the principal points of culling are shown



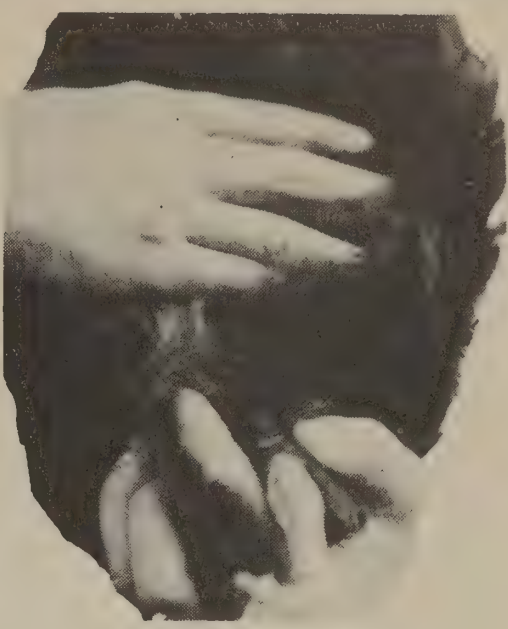
CULLING THE FLOCK

CULLING CHART

POOR LAYER

GOOD LAYER

YELLOW	SHANKS	WHITE
EARLY	MOLT	LATE
SMALL COLD DRY-SCALY	COMB AND WATTLES	FULL WARM WAXY
YELLOW	BEAK	WHITE
YELLOW	EAR LOBE	WHITE
PUCKERED DRY YELLOW	VENT	LARGE MOIST WHITE
CLOSE THICK STIFF	LAY BONES	FAR APART THIN PLIABLE
SMALL	BODY CAPACITY	LARGE



Measuring the Width Between the Pelvic Bones and the End of the Keel Bone (end of the breast bone). Distance judged by the number of fingers one can get between these bones and the width between fingers. Note spread of fingers on a good laying hen. Want a spread of four fingers or more.



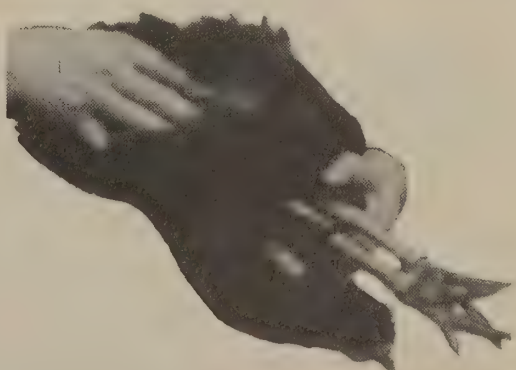
Measuring the Depth of a Hen Both hands are used with thumbs over the back fingers extending downward. (Hold legs back to keep chicken under control.) Depth is measured with the third and little fingers of both hands.



The Head of a Poor Layer Note the dull, listless eye, the small shrunken poorly formed comb and wattles and the sharp "hawk-like" beak.



The Head of a Good Layer The eye is keen and alert, the comb and wattles are full and developed. There is no sharpness to the head and nothing of a "hawk-like" nature.



Measuring the Distance Between the Keel Bones The distance between the keel bones of a laying hen is two or more fingers.

DUCKS

INDIAN Runner (from India) is rather small—nervous, great forager yet stands confinement well, a wonderful layer.

Pekin (from China) good layer of eggs generally heavier than those produced by any other breed (average about 35.6 ounces to the dozen).

Aylesburg, a white duck, a favorite in England.

Rouen is easily kept and fattened and attains great size and weight. The Rouen is also a good layer.

Cayuga (American) unpopular due to its black plumage and golden colored skin both objectionable in the market. Has the plumpest and best carcass—drakes frequently reach ten pounds in weight. Hens are excellent layers. Stands confinement well, is hardy and the young are easily raised and develop quickly.

Muscovy claimed the most satisfactory table duck as there is very little waste to the carcass. A very quarrelsome bird, making life miserable for other breeds.

East Indian, although too small to be a profitable duck for most purposes, has a large quantity of particularly delicious flesh on the breast. Good layer, eggs having rich yolks and are preferred by many to hens eggs.



Pertinent Paragraphs

Separate quarrelsome ducks and drakes. Ducks do not lay in nests but in corners of the pen. They sometimes cover their eggs.

Duck eggs do not keep as well as hen eggs. Incubate as soon as possible. They never should be kept over a week to ten days.

Duck houses must be well ventilated, sunny and dry for birds to thrive well. Don't try to keep ducks, geese and chickens together.

Better results will be forthcoming when ducks of the market breeds are mated about twenty ducks and four or five drakes in a pen.

Always keep a thick bed of dry hay, straw, leaves or cornstalks on the floor of the duck house.





COLLIS Process PURE DRIED BUTTERMILK



RAISING GEESE PROFITABLY

MANY general farms find a small flock of geese to be a profitable sideline to their other poultry interests. Geese as a rule are easy to raise. After the first month they require very little attention provided they are supplied with a dry shed where they may spend the night and with pasture and water to drink. They do not require a pond or stream.

Eggs may be hatched in an incubator but special attention must be given to moisture. It is usually best to let the old goose hatch them. Goslings may be fed for the first few weeks on the starting mash given on page 13. This mash should be moistened with water to a crumbly consistency and then mixed with fine lawn clippings or finely chopped lettuce, alfalfa or other tender greens. One part greens to two parts mash will give satisfactory results. If leaves from alfalfa hay are available, they may be used for greens using 1 part of dry leaves to 5 parts of dry starting mash. After four weeks the goslings will gather most of their own feed. Dried buttermilk in the starting ration will help to



bring the goslings up quickly past the size when they need special care.

Geese are natural grazers and will make wonderful growth on pasture with no other feed.

In the Fall geese should be prepared for market by heavy feeding of corn to put on fat.

In Europe it is customary to force feed geese during the last few weeks. Geese are confined in individual boxes just large enough to allow the bird to turn around. They are fed a mixture of corn meal, barley flour and buttermilk. This close confinement with heavy feeding improves the texture and flavor of the meat. Because of labor costs, this practice is not practical in this country but similar results may be obtained by confining several geese in a small pen and feeding a fattening feed made up of 85 parts of corn meal and 15 parts of Collis Process Pure Dried Buttermilk. This mash should be moistened with water until it is crumbly. This feeding may be done for the last two weeks before selling.



TURKEY RAISING



THE FEEDING of the turkey should be watched closely. If the flock seems to be in less than medium flesh, more corn should be fed. If the flock seems too fat, less corn should be fed and more wheat.

The turkey shed should be bedded with a thick layer of straw or hay and when the turkeys are kept in by bad weather, they should be forced to scratch their grain out of this litter.

Where the breeder does not have a wide range for turkeys then probably the White Hollands, Buffs, Narragansetts or the Blacks will prove more satisfactory than the Bronze because of the fact that the Bronze has a more wandering and restless nature.

Never keep and breed any turkey which has ever been seriously sick even if it seems to be entirely cured.

Turkeys will not thrive in warm houses but they must have protection from wind and storm. They do need plenty of fresh air.

When handling turkeys one should be very careful not to scrape the feathers off as they come out very easily.

In some parts of the country turkey raising is on the decline because farmers find it almost impossible to raise any satisfactory per cent of the poults hatched each season. This may be lowered vitality of the breeding stock due to blackhead, the dreaded disease of turkeys.

For this reason none but healthy birds should be selected for the next Spring's breeding. The best method of determining which turkeys to keep and which to dispose of, which to buy and which not to buy, is to know whether they have made a steady vigorous growth from the shell upward. Those that grow vigorously are likely to be healthy. Those that are a little larger than the average size for the breed are also likely to be stronger than the smaller ones.

A turkey man can tell from the appearance and action of the birds whether they are well and strong or not. If you are just starting on turkeys, have a man who knows turkeys pick your flock for you.

If especially interested in turkeys send for our special booklet on turkey raising.



BUTTERMILK FOR SWINE



WHOLE MILK can not be fed profitably to swine. Buttermilk and skim milk have practically the same food value for pigs.

Buttermilk differs but little from skim milk in composition, although it is usually somewhat richer in fat. Trials have shown that it has substantially the same value as skim milk for pigs. But feeders should be careful to know the buttermilk they are using. In using liquid buttermilk one should be sure that the buttermilk has not been allowed to ferment in dirty tanks. If this occurs buttermilk is a dangerous food. Collis Process Pure Dried Buttermilk is handled so as to insure its being safe and yet containing all the food value of liquid buttermilk.

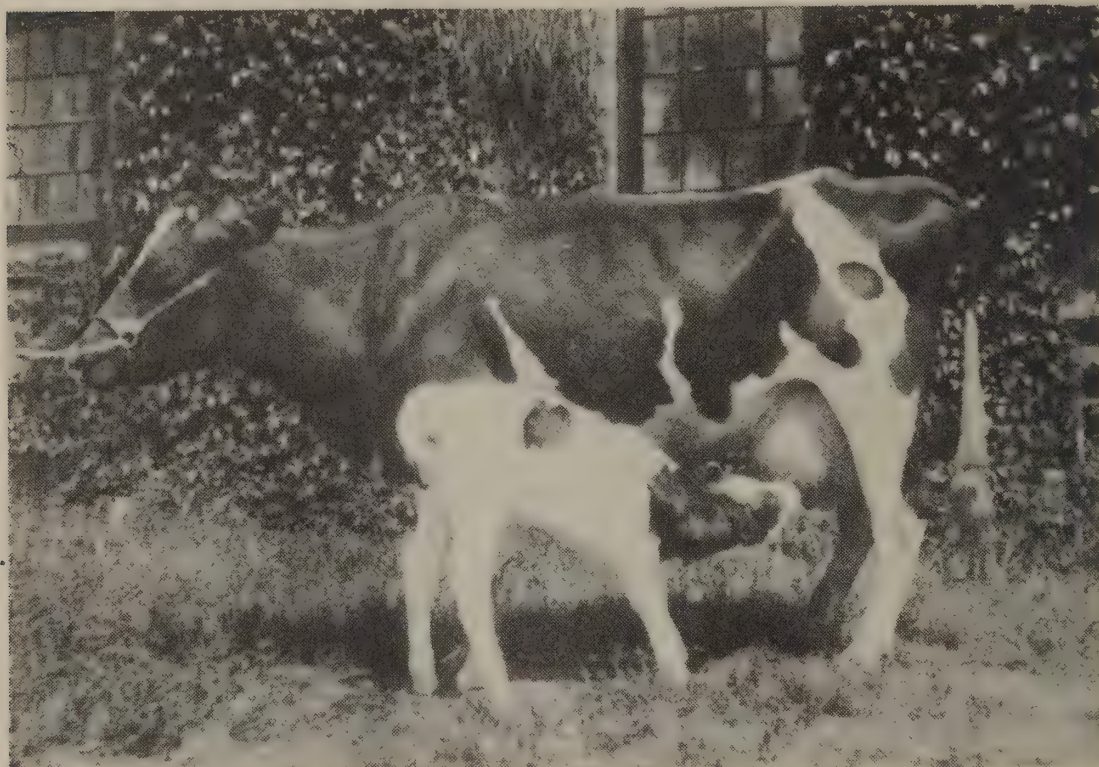
A 125 day test in the Massachusetts station and also a 62 day trial at the South Dakota station shows pigs in one lot fed buttermilk and corn, made just as large and economical gains as those in another lot fed skim milk and corn. These trials support the general experience that where no water has been added buttermilk is fully equal to skim milk for pig feeding.

The initial weight of the pigs was 77 pounds in both lots. The daily gain was 1.67 pounds. Pigs in lot 1 were given 17.1 pounds of liquid buttermilk and 4.1 pounds of corn. Pigs in lot 2 were given 17.2 pounds of skim milk and 4.0 pounds of corn. Feed required for 100 pounds of weight in lot one was 249 pounds of corn and 1,026 pounds of buttermilk. Feed required for 100 pounds gain in lot two was 246 pounds of corn and 1,036 pounds of skim milk. Collis Process Pure Dried Buttermilk can be fed with profit to pigs, especially at weaning time. Use 1 part Collis Process Pure Dried Buttermilk to 10 parts of wheat middlings, wheat shorts or ground oats as a slop feed. It is most convenient to mix the dry buttermilk and the grain product together in the dry form then use the mixture to make the slop. The dry mixture may be used in a self feeder.

At weaning time the above mixture may be used as the only feed. As the pigs grow older other grains such as corn may be fed in addition to the slop. As the pigs approach 75 lbs. in weight tankage may replace a portion of the buttermilk in the ration.



BUTTERMILK FOR CALVES



IT is considered too expensive to rear calves on whole milk alone. Greater numbers of dairymen each year, throughout the country, are selling whole milk for city consumption, for cheese making or for the manufacture of condensed and evaporated milk. Because of this profit in selling whole milk many of these dairymen sell the heifer calves from even their best cows for veal and depend upon buying cows to replenish their herds.

This practice prevents any improvement in their herds and makes up, of prime importance, the question of successfully raising calves on skim milk substitutes

Where available buttermilk is perhaps the best substitute for skim milk, but the watery slop sometimes obtained from creameries, from filthy tanks, should be avoided as such material is almost sure to cause scours. In the place of fresh buttermilk, which in many instances is far from being fresh, Collis Process Pure Dried Buttermilk should be used.

Minnesota Experiment Station found that calves raised on dried buttermilk were equal in every way to calves raised on average farms. None of the calves on the experiment were ever off feed and no digestive troubles were present in any of the calves fed dried buttermilk.

At the Kansas station it was found that buttermilk gave slightly less returns from calves than

skim milk but caused less trouble from scours.

Collis Process Pure Dried Buttermilk can be used with profit as a calf feed, because it is 92½% pure food, in concentrated form, without water.

Collis Process Pure Dried Buttermilk is 92% pure food solids with only 7½% water. It contains more than 8% mineral matter, 32½% protein. Over 40% nitrogen free extract, 6% fat, 5% lactic acid and no fiber. Its mineral matter aids in the building of strong bone. High in protein Collis Process Pure Dried Buttermilk provides this element absolutely essential to plant and animal life. Milk sugar is used to produce heat and energy and as in poultry causes favorable conditions in the intestines. 6% fat supplies the heat. Lactic acid aids in the regulation of the digestive organs, helps keep the alimentary canal open and free from disease.

Mix one pound of Collis Process Pure Dried Buttermilk with 11 pounds of warm water and use this mixture as you would a similar amount of fresh skim milk. As is customary where calves are to be raised on skim milk they should be fed whole milk for the first 2 weeks and the change to the dried buttermilk ration made gradually. After calves are 3 months old, Collis Process Pure Dried Buttermilk may be added to the grain feed and thus save the labor of pail feeding.



KEEP COLTS GROWING AND MARES IN FLESH

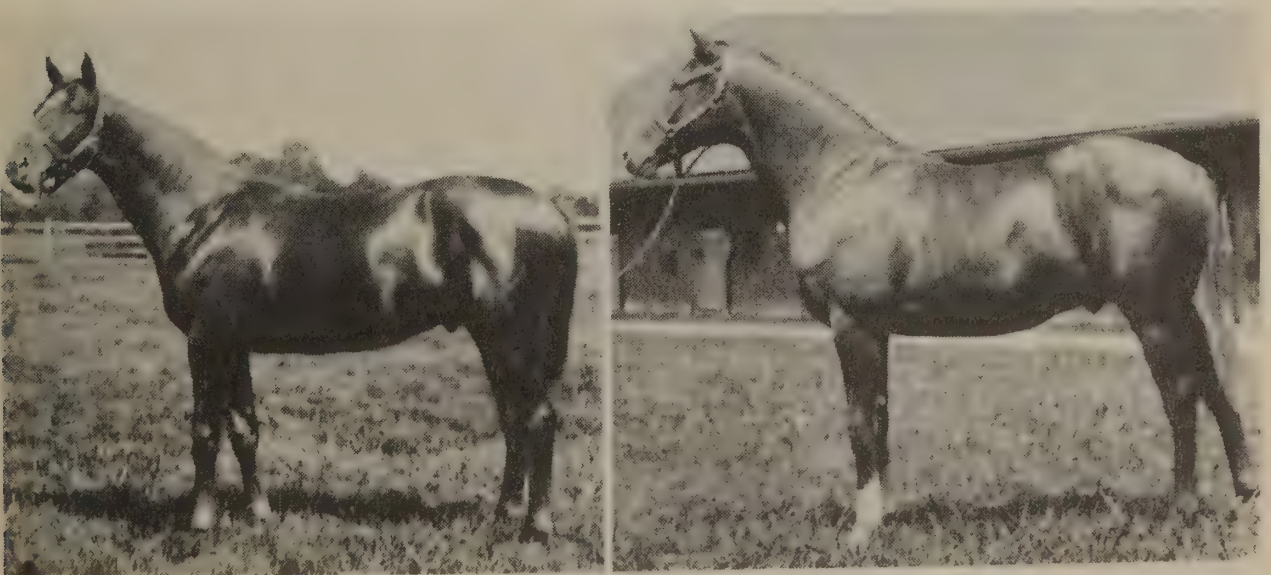
COLTS often suffer from the fact that it is necessary for farmers to work their mares hard during the suckling period. Doing hard work and suckling a husky colt is also quite a drain on the system of the mare. Since Collis Process Pure Dried Buttermilk is now available for every farm much of these difficulties can be avoided. Dried Buttermilk is being used very successfully in feeding colts. The accompanying pictures of Kentucky Thoroughbreds testify to the success of dried buttermilk for colts.

If a handful of dried buttermilk is thrown on top of a colt's grain feed he will soon learn to relish it and getting milk in this form he will require less milk from his dam.

The colt can be weaned earlier and milk feeding can be continued longer. Some breeders of fancy horses continue feeding Collis Process Pure Dried Buttermilk through the first year. The additional milk produces heavier, stronger bone development and consequently larger mature stock.

For racing stock it gives a two year old an advantage over his competitors who lack some of his size and strength owing to their lack of milk.

The colts pictured here and other colts from the same farms have made enviable records both on the track and in the sale ring.





E. L. WYCKOFF, Mgr.

L. I. WYCKOFF

P. D. WYCKOFF, Asst. Mgr.

WYCKOFF'S GRANDVIEW POULTRY FARM

Aurora, New York

February 25th., 1928

COLLIS PRODUCTS COMPANY
Clinton, Iowa

Gentlemen:

After several years continuous use of Collis Pure Dried Buttermilk, our enthusiasm for this splendid product continues unabated. It would be a blessing if the poultrymen of the country could be made to realize the great value in feeding dried buttermilk in worth-while quantities in their mash feeds, both to their young growing stock and to their layers and breeders. The much better growth and development and the freedom from disease thus secured, would pay the additional cost several times over. This we have demonstrated here at Grandview Farm.

While this breeding farm is operated on a carefully worked out principle of sanitation which has banished all poultry diseases that are the "bugbear" of a large percentage of the poultrymen of the country, we readily acknowledge that a large part of this great success - from the feed side of the question - is due to using a good percentage of dried buttermilk in the mashes.

Milk is recognized by the best dietary authorities as being a corrective food. In other words, it contains principles, which, while not only valuable in themselves, tend to improve the nutritive value of the other foods taken at the same time. Lactose - an ingredient of dried milk - creates in the intestines a friendly bacteria that has the peculiar properties of destroying the harmful bacteria nearly always present where milk is not used, and, in consequence, much better health results.

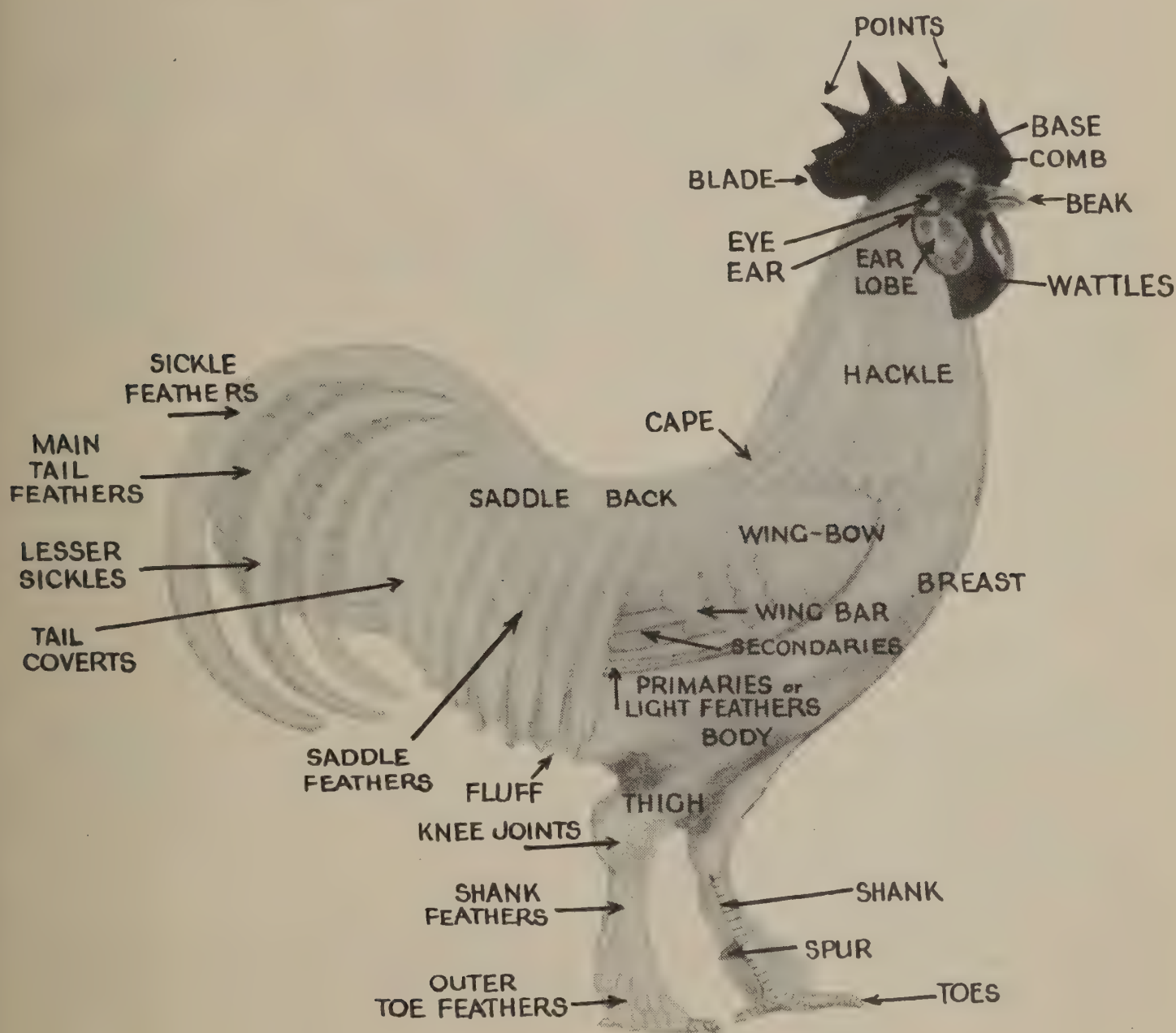
The lactic acid content of dried buttermilk is a mild and beneficial tonic, and in addition, greatly improves the keeping qualities of the milk powder. This, together with the uniform standard always found in the Collis brand, is the reason we so strongly urge poultrymen following the feed formulas as given in our booklet, "Successful Feeding and Sanitation", to use for their milk content, COLLIS PURE DRIED BUTTERMILK if they wish to get the best results.

Yours very truly

E. L. Wyckoff



NOMENCLATURE OF THE FOWL



JUST as the garage mechanic knows the general working parts of all automobiles, so should the poultry raiser familiarize himself with the locations and positions of the various parts of the fowl.

The value of this knowledge is primarily evidenced in breeding and culling.

In the above illustration, we have endeavored to show only the more important parts. Time spent in studying this chart and locating these parts on a live fowl may some day prove a profitable investment.



POULTRY DISEASES

ROUP

Roup may take several different forms and it is known under different names according to the stage it is in. It is known as colds, contagious catarrh, canker, diphtheria and some say chicken pox is a form of roup.

Mortality from 10—80%.

SYMPTOMS:

Coughing, rattling sounds in throat, running nose and watery eyes. In later stages the birds get canker in the throat, the eye often becomes swollen and full of a cheesy exudate. The comb and wattles often have pox on them along with the other symptoms.

TREATMENT:

Remove all diseased birds. Give a dose of salts (one pound in drinking water per 100 birds). Thoroughly clean and disinfect. For chicken pox, in addition to above, pull off the warts or growths and paint with iodine.

LIMBER NECK

SYMPTOMS:

Looks like a broken neck. Bird cannot walk—head twisted around over back as a rule.

TREATMENT:

Remove the cause. It is more important to find the materials (decomposed meats as a rule) which are causing the trouble, than to treat sick birds. Do not let dead birds, rabbits or other such material lay around where the chickens can find it. Limber Neck is nothing more than poisoning from this material.

TOE PICKING OR CANNIBALISM

Toe Picking is common among baby chicks which are brooded together in great numbers. Anything unusual attracts the attention of the chicks and starts them to picking. As soon as blood is tasted they will keep picking. Chicks are often picked around the vent.

TREATMENT:

Remove injured chicks, keep the chick occupied. It is sometimes stopped by darkening the brooder house.

LEG WEAKNESS

SYMPTOMS:

Chicks legs seem weak. They cannot stand. Crooked toes and beaks are indications.

TREATMENT:

This is a nutritional disease and is caused by the lack of Vitamin D. Feed birds in confinement 2% of cod liver oil or hard boiled eggs. If chicks are allowed direct sunlight they do not need the cod liver oil or egg yolks as the ultra-violet rays of the sun have the same effect.

WHITE DIARRHEA

White Diarrhea is a common occurrence among baby chicks. It may be caused by a specific germ or by improper feeding or brooding. The germ disease is known as Bacillary White Diarrhea.

SYMPTOMS:

The symptoms are usually the same whether disease is infectious or not. Chicks become "droopy," have loss of appetite, wings hang down, constantly chirping. The droppings are sticky pasting the chicks up behind.

POST MORTEM FINDINGS:

Liver enlarged with white and red stripes, lungs congested, grayish spots on liver. Yolk unabsorbed. The ceca contain in some instances yellow cheesy material.

TREATMENT:

For the non-infectious type correct the feeding and brooding methods.

There is no cure for the infectious type, one must practice prevention. The chicks become infected through the egg from an infected hen. The infected chicks can infect other chicks. The infected hens can be detected by the blood test and removed from the flocks.

Storrs Agricultural Experiment Station found that the feeding of sour milk to chicks lessened the mortality from this disease.



POULTRY DISEASES

CHOLERA

SYMPTOMS:

Birds die quickly, often many die at once without giving the indication that they were sick. Birds found dead under the roost and in the nest.

POST MORTEM:

Small yellow and sometimes red dreads on the liver. The liver may be enlarged. The first portion of the small intestine may be congested and the sack around the heart is filled with fluid. There is often a swelling containing a cheesy material just above the hock joint.

CONTROL:

Strict sanitary measures should be practiced immediately. Burn all carcasses. Remove if possible the healthy flock to new quarters.

Everything should be cleaned and disinfected with a 5% solution of good coal tar disinfectant. Clean the droppings up in the house and yard frequently. Cultivate your yard. Use copper sulphate in your drinking water.

TUBERCULOSIS

Tuberculosis causes heavy losses among chickens. It usually does not cause losses until the chickens are about a year old. It is not recognized as a deadly disease as birds die only now and then, but taking over the period of a year many birds are lost.

SYMPTOMS:

Birds giving noticeable symptoms are usually at least one year old. The disease is often known as "going light" rheumatism. Only a few birds are affected at one time. Birds go lame, they become thin, eye is bright and they have a good appetite.

POST MORTEM FINDINGS:

Muscles of legs and breast almost gone. Liver and spleen studded with tubercles. Intestines often have tubercles in the walls. (Tubercles are whitish and sometimes hard, usually they are filled with a cheesy material.)

CONTROL:

Get rid of the flock which has the disease. Thoroughly clean and disinfect. Place cleanings away from the house and yard where healthy birds cannot come in contact with them. Get a start of healthy birds.

There is a tuberculin test which is useful in detecting tubercular birds, but unless the flock is especially valuable it is more economical to get rid of the old flock and start with healthy birds.

COCCIDIOSIS

This disease affects birds of all ages, but is a common disease of chicks from four to fifteen weeks of age.

SYMPTOMS:

The symptoms are usually not noticeable until the chicks are about four weeks of age. Chicks are usually affected with the acute type, while mature fowls have the chronic type. Chicks affected with the disease are weak, they look drowsy, the feathers are ruffled and blood is passed with the droppings.

Birds with the chronic type have a pale comb and wattles and have a dejected appearance.

POST MORTEM FINDINGS:

The ceca (blind guts) in the acute type contain bloody material. In the less acute type the ceca are filled with a firm cheesy material. The kidneys often have a grayish streaked appearance.

CONTROL: (Also see pages 16 and 17)

Keep newly purchased birds in a pen by themselves for two weeks until sure they are free from disease.

The disease is caused by a germ which is passed off in the excreta. The disease is thereby spread in this manner.

Take out all sick birds.

Keep droppings out of feed and water.

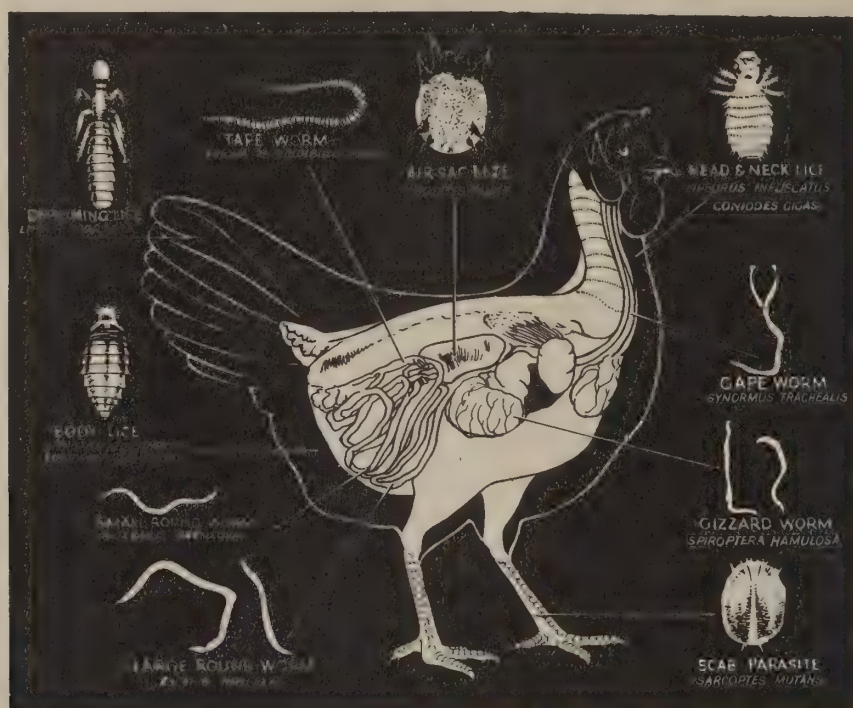
Clean house and yard of droppings. Disinfect with a 5% solution of a good coal tar disinfectant. Plow up the yard.

TREATMENT: (Also see pages 16 and 17)

At first signs of this disease, increase dried buttermilk to 40% of mash. Feed no scratch. Continue above mash for two weeks, or until disease disappears.

The University of California found that buttermilk given the chicks was the best method of control.

PARASITES OF POULTRY



IN ORDER to successfully fight poultry parasites the poultry keeper should have a clear conception of at least the most common grievances along this line.

Study carefully the parasites of fowls. Become acquainted with what the stick-tight, blue bug, louse, scab, parasite and mite look like. Also learn to recognize the tape, gape, small and large round worms, and on, or in, what part of the body of the bird these are to be found. Some of the parasites shown are natural size and others are as they appear under the microscope.

No bird can do good work when hampered by either lice or worms. Make every effort to keep poultry free from body lice and intestinal parasites. There are many common and proved remedies for the correction of this trouble. But correction will not be necessary if preventive measures have been taken.

Cleanliness is one of the most important preventives. See that the poultry yard is clean and free from disease-breeding rubbish. Changing the poultry run from time to time, giving poultry new, fresh, clean earth, will eliminate some of the dangers of parasites. When poultry runs are changed the old runs should be spaded. Runs being used should be raked occasionally in order to turn up fresh dirt in which the birds can work.

Nests should be kept clean. Houses should be sprayed with disinfectant. Birds should not be allowed to roost on nests. Fresh air, sunshine and disinfectant will do much toward eliminating the danger of parasites before they have a chance to make inroads into poultry profits.

If corrective methods are necessary your local veterinarian can suggest the most economical and speediest ways to eliminate both external and intestinal parasites.



COLLIS Process PURE DRIED BUTTERMILK



FEED ONLY COLLIS PROCESS PURE DRIED BUTTERMILK

J. J. SEASE, Colorado: "My hens increased at least 50% in laying when I used Collis Process Pure Dried Buttermilk."

W. A. Cushing, W. Va.: "Lost only 8% with Collis Process Pure Dried Buttermilk as against 40% without it last year. Flock weighed 1½ pounds each at seven weeks, 2 pounds each at nine weeks. Never saw chickens grow so fast or do so well."

Burdon Hunter, Florida: "We have had no white diarrhea since feeding Collis Process Pure Dried Buttermilk to our chicks. We gave the babies 30% buttermilk in dry mash for two weeks, gradually reducing the quantity. Keeps them thriving and growing splendidly."

Harry W. Nelson, Arizona: "I use Collis Process Pure Dried Buttermilk and highly recommend it for keeping poultry healthy and aiding them in laying more eggs."

W. R. Brown, New Orleans: "Used Collis Process Pure Dried Buttermilk last season and never have I grown such chicks though I have been at it twenty years. No loss, no weaklings and amazing growth." Later Mr. Brown wrote: "History is repeating itself.

My first hatch off, 95 chicks from 105 fertile eggs. Chicks two weeks old last Sunday. All alive and show amazing growth and development with Collis Process Pure Dried Buttermilk."

Mrs. Golda G. Spaulding, Nebraska: "Mother raised nearly every chick she hatched last year by following out directions with Collis Process Pure Dried Buttermilk."

Reese V. Hicks, Managing Director of the International Baby Chick Association, writes:

"To attempt to raise baby chicks without the use of buttermilk is the most serious mistake a poultry raiser can make. Dried Buttermilk has proved, in my own experience, not only more effective than any other form of buttermilk but has proved to be economical and practical. I can say that I am a believer of dried buttermilk in feeding poultry from the day they are hatched through the entire life period, as long as the hen or cockerel is alive."

To get 92½ pounds of pure milk solids out of every 100 pounds of buttermilk bought it is necessary to insist on Collis Process Pure Dried Buttermilk.

HINTS FOR THE POULTRY HOUSE AND YARD



CLEAN NESTS OFTEN

It is surprising to find that many poultry raisers who are extremely particular about the feed and care of their flocks continually get dirty eggs, due to dirty nests.

Good clean straw is cheap and it is just a few minutes' work to clean out nests. Clean the nests often if good clean eggs are desired.



KEEP POULTRY IN THE YARD

Poultry allowed to run around the barn lot eating with the hogs and horses and picking up grain under the corn crib never can be properly rationed. You have no control over them. Not only will you lose a great many chickens but you'll lose eggs as well.

FRESH WATER

Doesn't cost a cent and not over two minutes' time—yet how often do we visit poultry yards and find stale drinking water and filthy drinking fountains? Change the water often. Don't merely add fresh water but always throw out the old before adding the fresh water. Above all things rinse out the drinking fountain often.



KEEP OUT PESTS

Not only will rats, skunks, weasels, etc., kill birds but they are terrible disease carriers. Flocks otherwise healthy and free from disease can be killed off in just a few days by some of the deadly disease germs carried by rodents. Kill these pests at every opportunity and make your poultry yard as unsafe for them as possible.



CLEAN AND DISIN- FECT

Disease germs lurk in the crevices filled with grime. Sickness and death walk hand in hand with dirt and filth. Give your chickens a square deal. Keep them clean and do not neglect to clean and spray the yard and house often. In addition to cleaning the yard, rake it. This turns over a new soil surface in which the chickens can scratch.

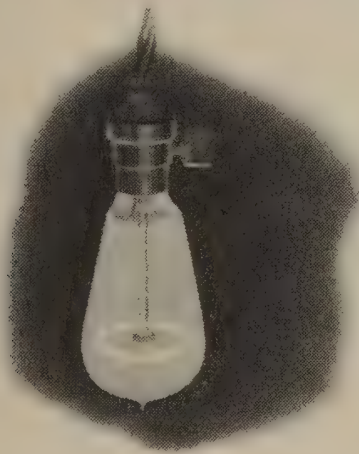
HINTS FOR THE POULTRY HOUSE AND YARD



AIR AND SUNSHINE

Just as milk is nature's gift—a wonderful food—so is air and sunshine nature's own choice tonic.

Give your flock plenty of range (but properly yarded, of course). Let them get sunshine and fresh air and you will have but little worry about sick chickens (assuming that you feed them correctly).



ARTIFICIAL LIGHT

The good hen naturally is not lazy. The only reason she quits her job early is because she can't see any longer to scratch and eat.

Within the last few years experiments have been made positively proving the value of artificial light with layers. During the fall and winter months the daylight period is short—consequently, the hen eats less and naturally lays less.

Artificial light puts daylight in the yard and house—that means eggs in your basket and money in your purse.

It is always well to remember that winter eggs bring high market prices so the cost of the light is well justified.



HOUSING

Elaborate, expensive chicken houses are fine. They add to the beauty of the farm and look mighty inviting to visitors but they are unnecessary.

A simple, well designed, inexpensive house is just as practical and a great deal less bother. However, don't expect to raise good chickens, heavy layers and fine market fowls in a tumbled down dilapidated coop.

In designing a chicken yard and house consider

1. Accessibility
2. Ventilation
3. Protection
4. Shade
5. Sunlight

Anyone wishing expert assistance (at no charge) may consult the Research Poultry Dept., Collis Products Co., Clinton, Iowa, in laying out and designing chicken yards and houses.



TABLE OF COMPOSITION OF COMMON POULTRY FEED STUFFS

(Courtesy Webb Publishing Co.,—"Profitable Poultry Production")

Feed Stuff	Water	Ash	Protein	Fiber	Nitrogen— Free Extract	Fat
	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent
Corn.....	10.9	1.5	10.5	2.1	69.6	5.4
Kaffir corn.....	12.8	2.1	9.1	2.6	69.8	3.6
Barley.....	10.9	2.4	12.4	2.7	69.8	1.8
Oats.....	11.0	3.0	11.8	9.5	59.7	5.0
Rye.....	11.6	1.9	10.6	1.7	72.5	1.7
Wheat.....	10.5	1.8	11.9	1.8	71.9	2.1
Rice.....	12.4	.4	7.4	.2	79.2	.4
Buckwheat.....	12.6	2.0	10.0	8.7	64.5	2.2
Sunflower seed (whole).....	8.6	2.6	15.3	29.2	21.4	21.2
Soybean.....	8.7	5.4	36.3	3.9	27.7	18.0
Cowpea.....	11.9	3.4	23.5	3.8	55.7	1.7
Canada field pea.....	15.0	2.4	23.7	7.9	50.2	.8
Peas.....	13.4	2.4	22.4	6.4	52.6	3.0
Egyptian corn.....	12.6	1.9	9.9	1.9	69.7	3.9
Hempseed.....	8.0	2.0	10.0	14.0	45.0	21.0
Corn meal.....	15.0	1.4	9.2	1.9	68.7	3.8
Barley meal.....	11.9	2.6	10.5	6.5	66.3	2.2
Soy-bean meal.....	10.2	5.0	35.9	3.4	28.0	17.5
Gluten meal.....	8.6	.6	30.0	2.6	49.2	8.8
Gluten feed.....	8.1	1.3	23.2	6.4	54.7	6.3
Brewers' grains.....	8.0	3.4	24.1	13.0	44.8	6.7
Wheat bran.....	11.9	5.8	15.4	9.0	53.9	4.0
Wheat middlings.....	12.1	3.3	15.6	4.6	60.4	4.0
Wheat shorts.....	11.8	4.5	14.9	7.4	56.8	4.5
Wheat screenings.....	11.6	2.9	12.5	4.9	65.1	3.0
Cottonseed meal.....	8.2	7.2	42.3	5.6	23.6	13.1
Linseed meal, old process.....	9.2	5.7	32.9	8.9	35.4	7.7
Linseed meal, new process.....	9.9	5.6	35.9	8.8	36.8	3.0
Peanut meal.....	10.7	4.9	47.6	5.1	23.7	8.0
Animal meal.....	5.7	39.9	39.4	.....	.....	10.7
Meat scraps.....	7.9	17.4	49.7	.....	.....	18.5
Meat meal.....	6.3	.....	48.4	.....	.....	12.9
Fresh bone.....	34.3	22.8	20.6	.....	1.9	20.5
Dried alfalfa hay.....	8.1	8.8	14.6	28.9	37.4	2.1
Mangel beets.....	90.9	1.1	1.4	.9	5.5	.2
Skim milk.....	90.6	.7	3.2	.....	5.2	.3
Buttermilk ¹	90.0	.7	3.0	.....	4.8	.5
Lactic acid.....	.....	.....	.....	.....	.....	.....

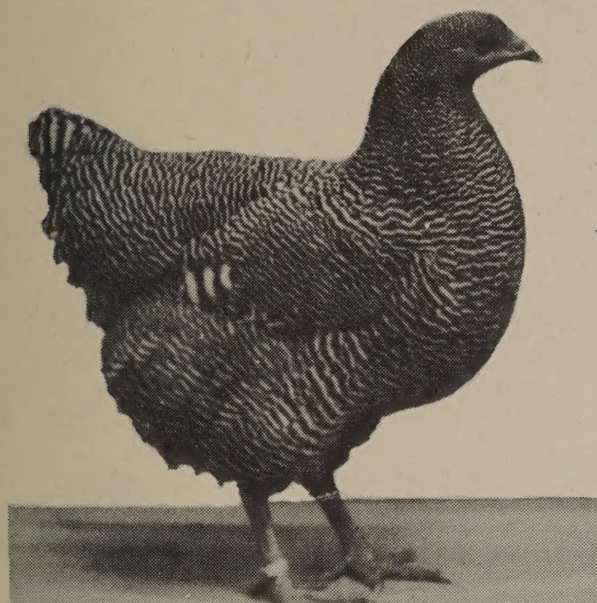
¹Creamery buttermilk (such as more commonly used) has even a higher water content than that shown in above table.

COLLIS PROCESS PURE DRIED BUTTERMILK

Water.....	7.50%
Mineral Matter.....	6.59
Protein.....	32.50
Nitrogen Free Extract.....	40.41
Fat.....	6.00
Lactic Acid.....	5.00
Fibre.....	0

Compare the valuable ingredients of this product with the ordinary poultry feed stuffs as shown in the above table.

SHOW BIRDS



TO THOSE poultry fanciers who feature show birds as well as general entries, at state and county fairs, we want to impress the importance of preparation of the bird. It is always preferable to work three and four weeks, and sometimes two months, getting the bird ready for the bench rather than to rely upon the last few days of hurried preparations. Feeding, is, without doubt, an essential requisite in the general appearance of show birds. Collis Process Pure Dried Buttermilk, given in generous portions, tends towards a fine gloss on the feather as well as a red comb and clear eyes. The lactic acid contained in the buttermilk will act in the nature of a general tonic in correcting any trivial organic trouble that might be bothering the bird and which might



not be discovered and yet which would more or less lower the bird's general appearance and characteristics.

Just before taking the bird to the show, wash the bird in warm water and use a good soap. Rinse in cooler water and if the soap is not all removed rinse in another water. Then in the case of white birds dip birds in a water to which just a very little bluing has been added. Dry with a towel and place birds in a warm room free from drafts.

In cleaning the shanks it is best to scrub and pick dirt from under the scales. Rub vaseline on shanks. Wipe the face, comb and wattles with two parts alcohol and one part glycerine.

DO YEARLING HENS PAY?

THERE have been many experiments conducted to determine whether or not old hens pay as well as pullets. One of the outstanding experiments recently coming to the author's attention is based upon the record of 140 pullets accorded the usual good care, feeding and housing. A careful record of their egg production showed they produced 167 eggs per hen in their first year at a profit of \$2.07 per hen.

In the Fall, this flock was culled to 50% and 70 old hens (two-year olds) were left. These 70 hens

were kept in a separate pen and fed the same mash ration as in their pullet year. They produced 188 eggs per hen at a profit of \$3.05 per hen—98 cents per bird more than the pullet year and a profit of \$1.98 per bird more when a cost of \$1.00 is added for the expense of raising pullets per bird per year.

The higher average production during the second year was due no doubt to closer culling as it is not normal for a bird to lay more eggs the second year than the first under the same conditions of feeding and housing.



HERE IS PROOF OF THE VALUE OF BUTTERMILK

STEELE'S OLD GOLD STRAIN
RHODE ISLAND WHITES
Eddyville, Iowa

Collis Product Co.,
Clinton, Iowa.
Gentlemen:

I am writing you at this time in regards to what I think of the quality of your Product.

I have been a user of your product for a good many years and have raised quite a number of National winners and several Champions on it, but last year I decided to try another product, which was much higher in price, but in my judgment, and in actual tests, Collis Process Pure Dried Buttermilk has them all beat for real profitable results, that is why I am back feeding it again.

We breed only high quality Rhode Island Whites, and feed only high quality products, but we have never found anything to give us better and more profitable results in the raising of young stock than Collis Process Pure Dried Buttermilk.

Yours to continue using it,

JAMES G. STEELE



Unionville, Missouri

Collis Products Company,
Clinton, Iowa.

Gentlemen:

The hundred pounds of dried buttermilk which I ordered about two months ago is about gone. It has given fine satisfaction and I would not try to do without it.

Please ship me at once by freight two 100 lb. sacks and one 50 lb. sack and draw on me sight draft as you did before.

Very truly yours,
PAUL BEBERMEYER

Williams, Indiana

Collis Products Co.,
Clinton, Iowa.
Gentlemen:

Kindly quote us your dried buttermilk in 500 and 1000 lb. lots delivered. Our trade here wants the Collis product if we are able to get it as it is more satisfactory than other makes.

Yours truly,
WILLIAMS MILLING Co.

Collis Products Co.
Clinton, Iowa
Gentlemen:

April 9, 1928

I was not satisfied with the results of my mash mixture last Fall and was persuaded to try a ready prepared feed for a full egg basket.

I tried this new feed for four months and never before had such a failure. This new feed cost me \$15. a ton more than my own mixture. It saves a lot of time, however, it cost me a little over \$100. more to get \$100. less in eggs.

I asked the feed dealer how much buttermilk was in the mash I was buying and he told me, "none." I am now mixing my own mash with Collis Process Pure Dried Buttermilk as I know that hens lay better when buttermilk is used.

PAUL KOEING



HOWARD POULTRY FARM
Wichita, Kansas

Collis Products Company,
Clinton, Iowa.

April 5, 1928

Gentlemen:

In reply to yours of March 26th, we are fully convinced that a liberal portion of milk in all chick mash is necessary for success, and having tried several different kinds we find that the Collis Product is the only reliable one.

Yours very truly,
W. G. HOWARD



Collis Products Company,
Clinton, Iowa.

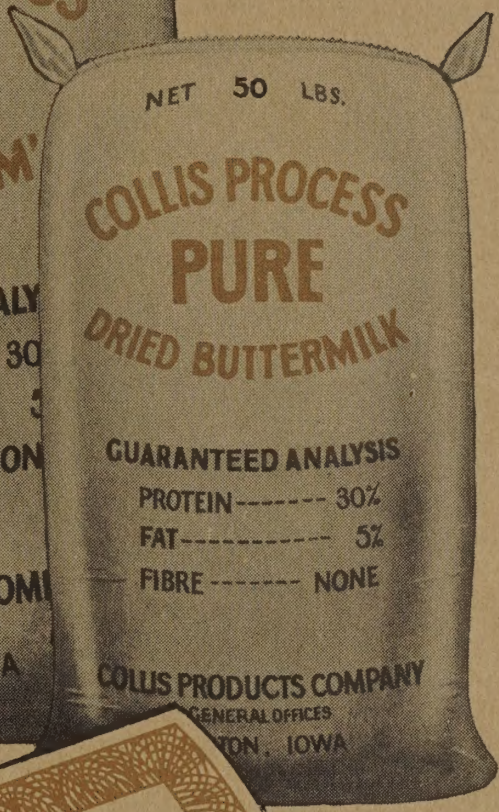
Tuscon, Arizona

Dear Sirs:

Enclosed find check, send me 200 lbs. dried buttermilk. We have tried many different brands but yours is the only satisfactory brand we have found up to date.

Respectfully,
W. H. BAKER, Box 488

Packed in
TWO SIZES



GUARANTEE

WE GUARANTEE that 1 lb. of Collis Process Pure Dried Buttermilk equals in feeding value $3\frac{3}{10}$ lbs. of Condensed Buttermilk or 12 lbs. of Liquid Buttermilk of average solid content. We furthermore guarantee that Collis Process Pure Dried Buttermilk contains all the Lactic Acid present in the Fresh Liquid Buttermilk from which it is made and that all the feed value of the original is retained.

Collis Products Co.
Clinton, Iowa.

SEAL

